

LUSTRE POTTERY

Technique, tradition and innovation
in Islam and the Western World

ALAN CAIGER-SMITH

The technique of lustre has been the inspiration for some of the most beautiful pottery in the world. During the thousand years since its first use on ceramics in early 9th century Iraq, its secrets have often been confined to a small circle of initiates. In this respect, as well as in its symbolism and its potters' quest to produce wares possessing the qualities of gold, it has strong links with alchemy. Alan Caiger-Smith, a potter with an international reputation who has made a special name for himself by successfully reviving the art of lustre, covers the whole subject from Abbasid Iraq to the late 20th century. His detailed technical knowledge together with his appreciation of the subtleties of lustre decoration give this absorbing book an unusual depth and appeal.

The historical thread takes us from Iraq with its striking early polychrome lustre to the lively figurative vessels of Fatimid Egypt; then via Syria to the varied and sophisticated wares made in Persia from the 12th century onwards. By the middle of the 13th century, production of fine lustre had begun in Moorish Spain, and that tradition was to culminate in the magnificent Hispano-Moresque wares of the 15th century, and in the Italian wares of Deruta and Gubbio of the 16th century. The present revival of lustre has its roots in De Morgan's and Zsolnay's 19th century experiments. An important chapter on alchemy and symbolism is followed by three substantial chapters on technique: two of them describe past and present methods of producing lustre, and in the third, Frank Hamer, the well-known ceramic scientist, answers a series of questions on the science of lustre.

Lustre Pottery is the long-awaited companion to Alan Caiger-Smith's classic work, *Tin-Glaze Pottery*.

This book is dedicated
to Helen
and to Mark

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AUTHOR'S PREFACE

In a sense this book began, without the fact being recognised, during a series of test firings in 1961-2. Only after twenty-six firings was any lustre achieved at all. Though reduced lustre is known to be difficult, this was an absurdly long trial period and it was caused partly by my ignorance and partly by the fact that since so few potters used the technique it was impossible to get practical advice. The trials were based on three books, two English and one Spanish, containing a few basic notes, and these had to suffice. Other writings existed, of course, but they were unknown to me at that time. Therefore whenever in the following years any information about firing lustre came my way, it was grasped with the eagerness of one piecing together a detective mystery. This book has grown from what I learned.

In themselves the working methods and the technical analysis of lustre effects are lifeless. The techniques came into existence because of the appetite lustre aroused and the fascination it has held amongst people of many times and places, from the days of Harun al-Rashid and the *Thousand and One Nights* right up to the present. As the historical chapters began to take shape they threw further light on the technique, on how the methods began, changed, and were sometimes lost again, and on the contribution of some remarkable individuals.

The question remained: what was the driving force and the source of the fascination? Was it satisfied by a lustre bowl or a tiled wall, or was it aroused by something else which these objects only partially satisfied? From these questions the open-ended chapter on Alchemy and Symbol began to emerge, and with it came new ideas about the origin of the earliest artisan methods.

None of the chapters in this book can be considered complete, that chapter least of all. They are attempts to bring together in balance three inseparable facets of the lustre tradition, its historical setting, its practical technology, and its symbolism, and the narrative continually shifts between them. Each of these aspects could absorb years of concentrated study, and much of the detail is better known to others than to me. Yet despite its inevitable shortcomings this attempt seems to me more desirable than a more systematic, specialised treatment of any single facet on its own.

The chapter on working methods, and the chapter in which questions about the physics and chemistry of lustre are answered by the ceramic scientist Frank Hamer, will principally interest professional potters and teachers and ceramic technicians, but they are written so that they can be followed by non-specialists, and they are more closely related to the rest

of the book than the reader might expect. They include the kind of knowledge which would have been useful when those trials were made in 1961, and which would have saved much time, expense and bewilderment.

Those who may make use of the practical parts of this book should remember that some of the materials required for lustre are poisonous or caustic; they should be handled and fired with care and any misadventures that arise are the practitioner's own responsibility. Lustre, like alchemy, has already made victims of some of its devotees, and I wish all those of the present time successful firings and a long and healthy life.

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Amongst potters, I extend my special thanks to Alan Peasod for enjoyable exchanges of knowledge and working methods, and for his dynamic approach to new possibilities of lustre technique and design; also to Graham Oldroyd of Sydney, who has likewise enlarged the language of lustre and was a kind host to me at an important time; to Clive Fiddis for sharing his practical research and for informing me of technical writings that I had

not known; to David Kanikianian, who first caused me to start gathering this material together for a lecture and later for publication in the periodical *Ur*; and to Frank Hamer for his tireless research in producing a reasoned sequence of scientific answers to technical questions.

My thanks go also to Jon Catleugh of the De Morgan Foundation for introducing me to much of De Morgan's work and for providing photographs; to Kate Catleugh for translating material from the Hungarian; and to them both for their enthusiastic support as friends and collectors over many years. Edmund de Unger has generously allowed me to draw extensively upon the Keir Collection, Richmond, to illustrate this book, and Major Raymond Ades has kindly permitted me to show examples of Persian lustre from his collection. I am also grateful to Elena Kingdon for translating quotations from old Italian, and to Ben Johnson for his more than professional attention given to some difficult colour photography.

I am indebted to Melody Cooper for expertly typing most of this book, sometimes several times over, and for her constructive comments on the presentation. And I thank my wife Anne-Marie for her positive criticisms as the text was read out to her, often in the early hours, and for her understanding during the years in which it took shape.

Shalford, March 1984

ALAN CAIGER-SMITH

DEFINITIONS

The tradition which is the subject of this book is best described as 'reduced-pigment lustre'. Since there are three other techniques which are also often termed 'lustre', although they are quite different, it is desirable to distinguish between them at the outset.

Reduced-pigment lustre. Almost all the lustre made before 1800 belongs to this family: it includes virtually all Islamic, Spanish and Italian lustre ware. The technique was revived in the nineteenth century. William De Morgan's work belongs to it, and some of the work of his contemporaries, Massier, Kähler, and Zsolnay. It is also used by some twentieth-century potters, myself among them. A summary of the technique appears on page 198.

Resinate lustres. This technique was developed around 1800. It made use of dissolved gold and platinum, and later of other metals, suspended with fluxes in a resin-balsam. The preparations are fired on to the ware in a clear, oxidising atmosphere, and the resin-balsam produces a localised reduction as it burns. The noble-metal preparations are bright and reliable and are extensively used in industrial manufacture. They are usually termed 'liquid gold' and 'liquid platinum' and the group as a whole is known as 'resinate lustre'. The development of this method is summarised on pages 156-7; early preparations are quoted on pages 218-19, and an unusual Islamic version is given on pages 218-19.

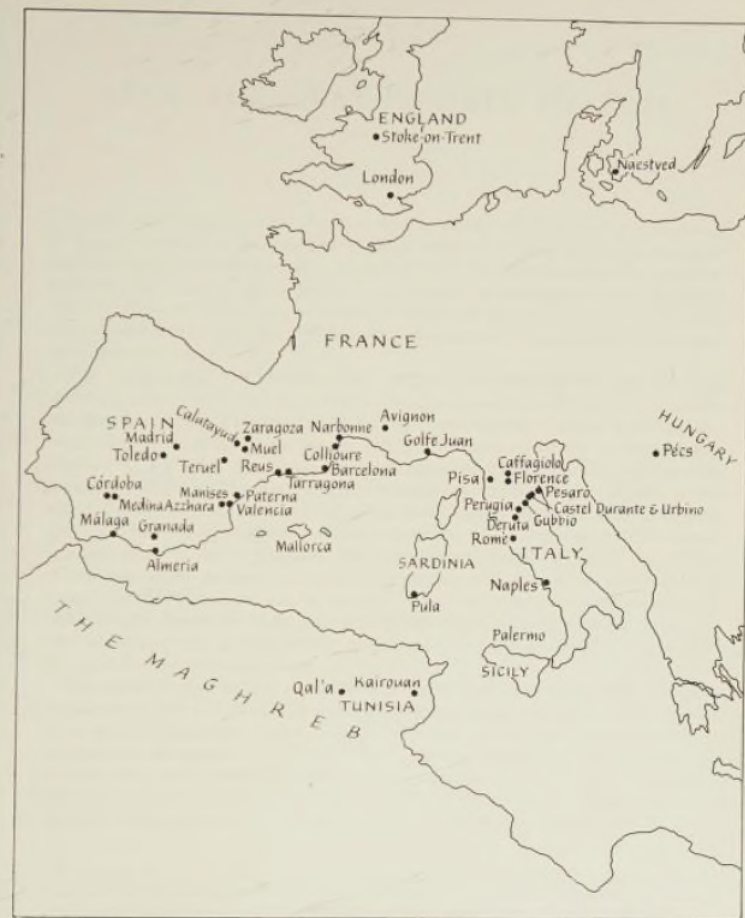
Reduced-glaze lustre. This is made by incorporating metal compounds in a glaze and reducing it as it cools after being fired. Reduced-glaze lustres usually cover the entire surface of a form. The technique has been known for centuries but it has been widely practised only since about 1870. It is referred to principally on pages 177-8.

Gilding. This is the application of gold-leaf or powdered gold to ceramics either with heat, or cold, with adhesives. It was well known to the ancient Egyptians and to the Romans and became popular in Europe from about 1700. It is mentioned principally on pages 155-6.

The following chapters concentrate on the first type of lustre. The others are referred to only for comparison.



above: The Near and Middle East. facing page: The Western Mediterranean



IRAQ: THE FIRST LUSTRED POTTERY

Lustred pottery began surprisingly. It is hard to discern in early lustre any suggestion of things to come. The lively figurative lustred vessels of Fatimid Egypt, the intricately decorated golden wares of Kashan, the grandeur of the Hispano-Moresque, are contained in the first lustres as the plant is hidden within the seed, but the beginnings look completely different. The only obvious connection with the future was the technique itself—the process of combining metal compounds with the surface of a glaze and converting them by reduction to an iridescent film of metal.

The earliest lustres were probably made in Iraq, in or around Baghdad, Basra and Kufa in the early ninth century AD.¹ Most of the surviving examples are small bowls with a turned-out rim, about 12 to 16 centimetres wide. Larger bowls and flat dishes or trays have also been found, up to about 40 centimetres wide, a few vessels apparently for pouring wine (Plates 1–5), and a few tiles. Most of these examples are fragmentary and originate from the site of the Caliphs' Palace at Samarra in Mesopotamia and from Fustat, then the capital city of Egypt, just south of Cairo, but a few finds have been made in Spain and North Africa and Pakistan. These remains are the outcome of a new and experimental idea without any antecedents in pottery tradition. The technique was difficult to control and the first results were highly variable. Like other experimental techniques in the world's history, lustre might have been given up in the early stages, but it survived these uncertainties and eventually became one of the most striking and admired of all ceramic traditions, pursued in different ways by the potters of many countries, and it remains a challenging field for expression and experiment today.

The earliest lustred pottery was multicoloured, whereas for centuries later lustre was almost always used as a single colour on each vessel and potters usually worked with only one single reliable pigment. At first, three or four colours derived from compounds of silver and copper were applied to each pottery vessel, resulting in stains and iridescent deposits of olive-green, brown, amber, orange and yellow, crimson and a very dark red which was sometimes so dark as to look almost black. The olive-green and amber colours were usually distinctly flecked because of the mixture of particles in the pigment (Colour Plate I).

¹ See especially E. J. Grube, *Islamic Pottery of the Eighth to the Fifteenth Century in the Keir Collection*, London 1976, and Geza Fehérvári, *Islamic Pottery: a Comprehensive Study based on the Barlow Collection*, London 1973. Both these books deal with Islamic pottery widely and in detail and include comprehensive bibliographies.



1. Small bowl, about 12.5 cm wide: polychrome lustre on opaque glaze. The lustre is deep red with some vapour-flashing and flecked tawny-amber, breaking to copper-green in parts of the central area where the bowl was not fully exposed to reduction. The back is covered with rapid dab-strokes, flashed with vapour. The glaze is slightly greyed by reduction. Iraq, probably 9th century. *Musée du Louvre, Paris. See pages 21 and 29*



3. Fragment, 6 cm wide: brown, yellow and greenish lustre, on opaque glaze. The Arabic inscription reads 'amī Ali', work of Ali, a rare but by no means unique example of a painter's signature on early glazed pottery in Iraq, 9th century. *By courtesy of the Victoria and Albert Museum. See page 21*



2. Small bowl, 19 cm wide, 5.5 cm high: polychrome lustre, an acid yellow with flecks in the colour, a silvery yellow and greenish yellow on opaque off-white glaze. Leaves, flowers and petals are discernible in the loose vegetal design, which was mapped out in fine lines before being filled in with colour and pattern. This example is looser than many, but unusually elaborate. Iraq, 9th century. *Musée du Louvre, Paris. See pages 21 and 24*



4. Tray or dish, about 36 cm wide: non-lustrous brown and yellow decoration from pigments based on silver. These colours were probably intended to be lustrous but received insufficient reduction. Iraq, 9th century. *By courtesy of the Victoria and Albert Museum. See page 21*

5. Upper part of a ewer, 16.5 cm high: painted with deep-brown and greenish 'lustre' on an opaque white glaze. Under the handles are palm-leaf impressions similar to the painted design. The colours are barely lustrous at all and are of the kind that develop in the early stages of the reduction-firing. Iraq, 8th-9th century. *Musée du Louvre, Paris. See page 21*



The first lustres seldom included any figurative designs, except for a few rare instances on tiles. The decoration on pottery vessels was a loose rendering of palmettes, rosettes, beads, cusps, wheels and a variety of foliage designs, all treated so freely as to be almost abstract (Colour Plate II). The design was drawn with a fine line of golden-amber and was then filled in with panels of small-scale patterns—dabs, dashes, 'peacock-eyes' (circles with a golden centre), herring-bone strokes, bands, cross-hatching and assortments of loops and knots. The speed of the painting, together with the abundant ornament and the variety of partly accidental colours which developed in the firing, lend many of these pieces a wild appearance. At first glance one might think that the painters had followed a series of improvisations to produce the greatest possible optical excitement, but there is always an underlying order. Most of the designs are in fact very free versions of garlands, wreaths and simple geometrical forms found in late Roman ornament (Plate 2).

Since it is difficult to obtain any lustre at all on pottery, and the technique is acknowledged to be one of the least controllable in ceramics, it has been thought strange that the first lustre-makers should have added to their problems by using a variety of pigments, while their successors usually employed only one colour. The explanation of both the colour range and the designs is provided by the practices of contemporary glass-workers. Many writers have referred in general terms to glass as the origin of pottery lustre, but the connection has only been clearly demonstrated by the Swedish scholar, C. J. Lamm.

Lamm showed that Egyptian glass-workers occasionally decorated their vessels with colours derived from silver and copper from at least as early as the fourth or fifth century AD. They employed two distinct methods, one for applying line decoration to clear glass and another for making coloured-glass mosaic. In the first method they painted the compounds of silver and copper on the surface of the glass and re-heated the object in the furnace to soften the glass and fix the stain. The compounds changed colour because they became reduced, all the oxygen having been consumed by the flames of the furnace, and the painted designs became yellow, amber, or red, with a slightly lustrous sheen.² The designs were almost always leaf-and-flower motifs, scrolls, stems, garlands, formalised birds or inscriptions (Plate 6). The second method was glass mosaic, which was a speciality of Alexandria. It was made by staining the molten mass of the glass with compounds of silver, copper, iron or manganese, and forming coloured or multicoloured rods and beads which were then fused together into a solid block with intricate small designs of coloured circles, squares, rosettes and stripes. Some were used at Samarra to decorate walls and alcoves in the palace. In glass-making the drawn designs and the mosaic designs do not occur together because they depend on different manufacturing techniques. However, when pottery-painters of the early ninth century tried painting their glazed vessels with the same colouring agents as the glass-makers, they borrowed ideas from both kinds of glass manufacture and made from them a new hybrid design. They drew formalised leaves, flowers and



6. Glass beaker, 6.8 cm high: painted with a lustre design representing a vase of flowers. Copper and silver decoration on glass produced a colour-stain rather than a lustre, but it suggested the idea of applying lustre to glazed pottery. Egypt, 6th–7th century. By courtesy of the Victoria and Albert Museum. See page 24.

garlands with contour-lines and filled in the internal divisions and the background with the patterns suggested by *millefiori* glass mosaic, such as the 'peacock-eye', the small chequer, and the rosette. Thus the two contrasting ingredients of the designs of early lustred pottery came together, the one from an old tradition of formal decoration and the other from the patterns occurring in the glass material itself.

While the first painters of lustred pottery inherited some of their techniques from glass-workers, and may actually have been glass-painters as well, the glass-makers probably derived their colouring materials from traditional methods of metalworking. Alloys of silver and copper had long been used as substitutes for gold in the ancient world, and had been applied in leaf form to wood, stone and glass long before they came to be applied to glass by heat in the furnace. Many receipts for metal alloys are known, and they closely resemble the materials later used for decorating glass and glazes by fusing metallic pigments into the surface. Several hundred preparations are described in the papyri of Leyden and Stockholm, written in Roman Egypt in the third century AD. This practical knowledge was later inherited and adapted by the artisans who worked for the Arab conquerors of the Middle East.³

Glass decorated with silver and copper 'lustre' is known to have been made at Fustat and at Alexandria and Basra. Two Egyptian pieces, dated 772 and 779 in Coptic numerals,

² C. J. Lamm, *Oriental Glass . . . and the Early History of Lustre Painting*, Stockholm 1941, especially pp. 19–31.

³ F. Sherwood Taylor, *The Alchemists*, London 1951, p. 20. An alloy receipt cited in this book is quoted on page 218. A French translation of the chemical parts of the papyrus of Leyden is given by P. E. M. Berthelot in *Introduction à l'étude de la chimie des anciens et du moyen âge*, Paris 1880, pp. 28 et seq.

are in the Islamic Museum, Cairo, and the later of the two is described as having been made at Fustat.⁴ Two examples with inscriptions including the name of Basra belong to the ninth century.⁵

Metallic compounds could be applied to the surface of pottery glazes by re-heating the vessels until the glaze began to soften, that is, at a considerably lower temperature than that of the original glaze firing. It was more difficult than applying similar pigments to glass, because the firing which melted the glaze itself required a clear, oxidising atmosphere, while the development of a lustre finish necessitated some degree of reduction. In glass-furnaces reduction occurs as a matter of course, but for firing earthenware glazes it normally has to be avoided. To obtain lustre on pottery glazes, therefore, the normal firing process had to be modified. Care would also have had to be taken not to crack the ware by heating it too fast, because clay expands at a different rate from the glaze which covers it. Two materials were involved instead of one.⁶ Lustrated pottery had certain advantages, however; metallic pigments combine with glass and are seen as part of the translucent material, whereas on ceramic glazes the metallic film, set off by an opaque background, looks brighter.

If potters did in fact adapt certain methods from glass-working it is hardly surprising, since the manufacture of pottery and glass involves many of the same materials, and has always been closely connected in the Middle East.

Traditional Islamic glazes are of almost the same composition as blown glass, and could well have been prepared from surplus material from the glass-furnace.⁷ Ordinary soda glass, crushed and ground and applied to a clay vessel, makes a highly fusible glaze. It crazes severely, but this can be prevented by adding silica, or by adding powdered glass to the clay before it is worked. Both methods have been followed in the Middle East at various times (see pages 199–200).

Glazing had been known in ancient Egypt, but it was mostly used to beautify ceremonial objects, seldom for pottery. Only in the eighth century AD was glaze frequently applied to vessels intended for use, and these were probably limited to palaces within the Byzantine and Islamic empires. Glazed pottery decorated with lustre was even rarer and seems to have been made at first only for the Abbasid court in Baghdad and Samarra.

⁴ G. T. Scanlon, 'Fustat Expedition: Preliminary Report, 1965, part 1', *Journal of the American Research Centre in Egypt*, vol. V, 1966, p. 105.

⁵ Richard Ettinghausen, 'An Early Islamic Glass-making Centre', *Record of the Museum of Historic Art*, Princeton University, vol. I, no. 2, 1942, pp. 4–7. See also a note by F. R. Martin on lustrated glass, *Burlington Magazine*, August 1928, p. 92, and the same author's book *Lustre on Glass and Pottery in Egypt*, Collana di Studi d'Arte Ceramica, no. III, Faenza, 1929, full of interesting ideas but also of inaccurate dating.

⁶ R. H. Brill, 'Chemical Studies of Islamic Lustre and Glass', chapter 16, pp. 351–77, in *Scientific Methods in Medieval Archaeology*, ed. R. Berger, University of California Press, 1970.

⁷ Aly Baghat and Felix Massoul, *La Céramique musulmane de l'Égypte*, Cairo 1930, p. 34, give comparative analyses. See also R. H. Brill, op. cit., p. 361 for chemical analyses of five glasses of tenth to eleventh-century date from Fustat. The association of glass-making and glazed pottery is still close. In a letter written to me in 1965, Mr Gurcharan Singh of the Delhi Blue Pottery describes his turquoise-blue glaze, made from finely ground borax, copper oxide, and an alkaline frit, adding, 'Here we can get leadless frit cheaply, being the base of the glass bangle industry.'

The Abbasid dynasty began in AD 750 when Abu'l Abbas overthrew the Umayyads of Damascus and founded a new caliphate in Iraq. He was succeeded by his brother, known as al-Mansur, who began to build a new capital in 762 on the site of a village called Baghdad. The new circular city was called Medinat-al-Salaam, 'The City of Peace'. The dynasty reached its greatest wealth and power under al-Mansur's grandson Harun-al-Rashid (766–809) whose court was also a centre of learning and of arts and sciences. Its splendours are romantically reflected in the traditional tales of the *Thousand and One Nights*.

The enormous palace-complex of Samarra, about a hundred miles north of Baghdad, the principal source of examples of early lustre,⁸ was begun by Caliph Mu'tasim in 836 and abandoned in 883. There is therefore strong evidence for the dating of early polychrome lustre as a continued production, though the first experiments may have occurred earlier, possibly in the days of Harun-al-Rashid. At the same period, tiles decorated with lustre were sent by the caliph to be set in the great mosque of Kairouan in Tunisia, which was partially reconstructed in the ninth century. Lustre fragments have also been found in some quantity at Fustat, which was in the ninth century the main citadel in Lower Egypt. These finds are probably remains from the court of Ahmad ibn Tulun, an officer from the court of Samarra who was posted to Egypt in 868. Within a few years he began rebuilding the city, closely following the architecture and customs of Samarra, and introducing similar luxuries. The silks have perished, the gold and silver were long ago melted down, and the jewels are scattered, but the broken lustre ware remained in the ground, being of no value. Other fragments of lustre have been excavated from the site of the palace of Qal'a in Algeria, which was until 1052 the capital of the Hammamid princes, and which was also built in emulation of Samarra.⁹ Thus in the ninth century, and in fact for several centuries to come, lustre was made for courts and courtiers and seldom appeared in any other setting.

Court vessels were usually made of gold, silver, bronze or glass. The admission of pottery was a novelty. Pottery would probably not have been considered acceptable for this level of society had it not been glazed and interestingly coloured. Compared with metal vessels, pottery always remained unimportant: the material was not valuable in itself, nor was equivalent skill devoted to it. Engraved and inlaid metal with its complex designs, imagery, and inscriptions took months rather than hours or days to complete. The first court pottery probably fulfilled the same purposes as glass: the small vessels seem to have been used for serving wine and small delicacies. This may be another reason why the first lustrated pottery was decorated like glass: craftsmen of that period, indeed most craftsmen of past ages, were not expected to originate anything but to imitate, and it was perhaps natural to follow the designs already familiar from a similar category of objects. This may explain why lustrated tiles were decorated differently.

It was no accident that the development of the first lustrated pottery coincided with the

⁸ F. Sarre, *Die Keramik von Samarra*, Berlin 1925. Sarre devoted most of his working life to excavations in and around Samarra and his many publications describe them in great detail.

⁹ Lucien Golvin, *Recherches archéologiques à la Qal'a des Banu Hammad*, Paris 1965.

introduction of white glazes. But for these glazes it might never have started at all.

White glazes were new in the Middle East. It is virtually certain that they developed as an attempt to imitate the white glaze on T'ang porcelain from China, which occasionally came to the Abbasid court either as a gift to the caliph's entourage or as plunder, and was greatly admired. The hard material and its beautiful off-white glaze had no equivalent in any local pottery manufacture.

Porcelain could not be made in the Middle East because no suitable clays were available. Even today, no natural clay comparable with Chinese porcelain clay has been found anywhere in the world, and the potters of the rest of the world have spent many centuries trying to find equivalents for it. The first of these attempts occurred in Iraq in the early ninth century: a completely different type of clay, light in colour, was covered with a completely different type of off-white glaze, fired at a much lower temperature than the Chinese wares. Pottery forms derived from T'ang porcelain were made with these materials and superficially there was a resemblance, but the material itself was totally unlike.

Two kinds of off-white glaze have been recognised from excavations; they were whitened in different ways. One was an alkaline glaze which, if fully fired, would have become clear, in which case it would have revealed the warm buff colour of the clay underneath. It was deliberately slightly underfired so that a mass of small bubbles was trapped in the glaze wall, making it cloudy and opaque and somewhat white. The other was a glaze whitened with particles of tin oxide, introduced into the glaze material in combination with lead. The lead compounds helped the glaze to melt and the tin oxide, which does not dissolve easily in glaze or glass, remained as a fine cloud of white particles dispersed all through the glaze coating.¹⁰

New things come from new situations. Possibly the discovery of white glazes occurred because of the presence in Baghdad of skilled craftsmen captured in an Abbasid victory over the Chinese near Samarkand in the year 751. One of these prisoners, named Tou Houan, was set free eleven years later and returned to China, where he later described how he and his colleagues introduced their methods of textile-manufacture, gold-working, painting and 'many other crafts' into the royal city where they were employed.¹¹ Another innovation, accompanying the new white glaze, was the development of a dense, light-coloured, synthetic clay, far superior to the natural clays in traditional use. It is known now as 'Samarra body' because pottery made from it has been found plentifully on the site of the palace. It is an irresistible speculation that the break with tradition was brought about by Chinese craftsmen attempting to devise a new material which might be as hard

as their native porcelains, together with glazes simulating those of China. If so, they did not succeed, but they made a remarkable technical discovery. Most of the vessels made of these materials are small bowls with a distinctly turned-out rim, probably used as drinking vessels. The form had no precursors in Islamic pottery tradition, but was quite common in China. A few surviving examples are plain white; some are decorated in green, brown, or cobalt blue, and others in lustre colours. This was the bowl form most frequently used by the early pottery lustre-painters, mentioned at the beginning of this chapter.¹²

In later centuries lustre-painted pottery was meant to have bright metallic reflections and sometimes to look like gold. This expectation probably did not exist when the early polychrome lustres were made. Some examples have metallic reflections, but on others the silver and copper pigments simply left dull stains similar to those on lustred glass. The lack of brilliance is not due to deterioration but to low firing with insufficient reduction to bring the compounds to the metallic state.

The earliest of the polychrome lustres are only called lustres because in course of time they led to other colours with a reflecting metallic sheen. On some sherds colour-stains and metallic surfaces occur together. This is because some of the pigments were more easily reduced than others. Red colours from copper, for instance, required a more intense reduction than the silver-based colours. They may have begun accidentally, but the reds are sufficiently frequent to suggest that the firing technique was deliberately changed once the importance of reduction was appreciated. Glazes containing lead and tin, however, are altered by prolonged reduction, and some red lustres are on glazes which have changed from their original cloudy-white to a speckled grey, because the lead and tin had themselves become slightly reduced. The effect could have been avoided by periodically admitting air into the kiln-chamber, but this appears not to have been recognised for some time, since the red lustre on grey glaze is quite common and it seems unlikely that the potters deliberately aimed at this subdued effect (Plate 1).¹³

While the lustre-makers seem at first to have been content with the range of colours already known from glass, they must quickly have recognised that certain pigment preparations were capable of leading to metallic reflections as well as colours. Some of the reflections looked like gold. These came to be used most often, but they were usually painted alongside pigments that produced only colour-stains. It is usual in the early lustres to find a design painted in red, brown or amber-green edged by a golden line, or a composition in which metallic and non-metallic colours alternate. All the pigments could have led to metallic

¹² The clay-body and the glaze were remarkably well adjusted. Crazing is rare; in fact the body tended to shrink more than the glaze so that after many centuries the glaze sometimes shales off in large flakes. This characteristic distinguishes the ware from all other Islamic glazed pottery, and suggests that the technical methods never became traditional. The body was distinctly different from the unglazed clays of common pottery and the siliceous paste bodies of the Seljuk period (eleventh to thirteenth centuries). See J. W. Allan, L. R. Llewellyn, and F. Schweitzer, 'The History of So-called Egyptian Faience in Islamic Persia', *Archaeometry*, 15, 2, 1973, p. 169 et seq.

¹³ The most striking examples I have seen are in The Louvre Collection. Some were found in the French excavations at Susa. I am grateful to Mlle M. Joël for allowing me to handle these interesting experimental early lustres.

¹⁰ This is the simplest way of putting it. The two types of white glaze were not really quite so distinct. They are best thought of as extremes of a sliding scale, an alkaline glaze base with more or less lead and tin added to assist the opacification. The glaze of which the analysis is given in the table on page 236 appears to belong to the cloudy-alkaline type but was found by analysis to contain small amounts of lead and tin. The subject is discussed in detail by Dr Yolande Crowe in 'Early Islamic Pottery and China', *Transactions of the Oriental Ceramic Society*, vol. 41, 1975-7, pp. 263-75.

¹¹ Paul Pelliot, 'Des Artisans chinois à la Capitale abbasside en 751-762', *T'oung Pao*, vol. XXVI, 1920, pp. 110-12.

reflections in the right firing conditions, but this effect was not originally the sole criterion of success.

The variety of colours suggests that the lustre-makers were trying out many different copper and silver alloys. Chemically pure metals and compounds such as an experimenter would use today were of course unknown at that time; and the most likely source of the metals was the silver coinage and articles of brass and bronze, most of which included admixtures of tin, lead, antimony and zinc. The effects differed according to the materials and their concentration and the particular conditions of each firing. The makers of polychrome lustre had many choices and they explored them well. Later periods produced much brighter lustres, but the range of the first glimmering colours has not been surpassed in the succeeding thousand years.

The early lustred pottery was extravagant and sometimes dramatic, and its adoption by court society is hardly surprising. It was innovative and ingenious, but the technical skill was seldom matched by skilled painting, and most of the designs were undemanding. Only one known piece has any figurative decoration (Plate 7). These lustres were something of a paradox—a court convention which had not yet become courtly.



7. Bowl with everted rim, 24.3 cm wide: brown, amber, greenish-gold, and deep-red lustres on semi-opaque glaze. Heavy circles and dashes are painted on the exterior. This is the only known example of polychrome lustre with an animal emblem: a new idea is emerging. Mesopotamia, 9th–10th century. Ashmolean Museum, Oxford.

2

EARLY FIGURATIVE LUSTRE OF IRAQ

The makers of the early lustres must have noticed that while certain pigments became green or brown, pink or red, others could shine like gold. From about the beginning of the tenth century they began to concentrate on the pigments that could produce this seeming gold. Now for the first time the simulation of gold became of the first importance. It was not always successful: amber and greenish-yellow occur in the monochrome lustres of this period as well as gold, but these colours arose from variations in the firing, not from different pigments, and the variety was unintended. However, the technique became generally more methodical; the uneven firing, greyed glazes and speckled pigments of the early polychrome lustres are unusual in the work of the tenth century.

The monochrome 'golden' lustres were probably produced from pigments based upon silver with little if any copper. None of the surviving examples have even the least sign of redness which would almost certainly have occurred had any copper been present. This evidence is not entirely conclusive, however, because in the early stages of reduction copper produces yellow, and it could have been added to the pigment to intensify the desired golden colour.¹

The monochrome lustres were based on a new idea. Instead of an overall design with many forms and colours they displayed a single human or animal figure, such as a musician or a dancer, a bird, a hare, a gazelle, with a background of contour-panels. The pattern motifs of the polychrome lustres appeared on the outside of bowls and in panels, but they were now only ornaments filling the areas around the central figure (Plate 8, A and B).

These figurative lustres were made in a number of new shapes as well as the well-favoured bowl with a turned-out rim; cups and beakers were also lustred, and small jugs, small jars, shallow dishes, and platters with a flat base and tray-like rim. Their imagery was specially related to a ruler's court (Plates 11 and 14).

The figures were boldly drawn and some have a curiously modern appearance; the images, though easily recognisable, were treated with an awareness of abstract forms and of the unpainted shapes left around them, and many designs are dramatic (Plates 9 to 13). They were not intended to be simply decorative but to convey a message. They were as much

¹ As was the case centuries later with the bright golden-yellow of Deruta. R. H. Brill, *op. cit.*, pp. 370–1 explains that copper compounds can give a yellow stain (from Cu_2O) as well as a red; also that by means of ion-exchange, silver pigments on a soda-based glaze readily promote in reducing conditions a lustre film which is a colloidal dispersion of metallic silver.



9. Very small bowl, 8.5 cm wide: amber lustre on tin-glaze, representing a leaping stag. The inscription is painted in cobalt blue. Iraq, 9th–10th century. By courtesy of the Victoria and Albert Museum. See page 31



8A, B. Bowl with everted rim, 31 cm wide by 7.4 cm high: greenish-yellow lustre on tin-glaze. Within the foot is a Kufic inscription of good wishes to the owner, supplementing the greeting in the interior. The splendid bird is surrounded by small-scale patterns which were used earlier on the polychrome lustres. Iraq, 10th century. Musée du Louvre, Paris. See page 31



10. Small bowl, 14.4 cm wide: amber lustre on opaque glaze, with a bird and spouted pot. Crude circles and line-and-dot pattern on the outside. Iraq, 10th century. Keir Collection, Ham, Richmond, England. See page 31



I. Four sherds from polychrome lustre bowls: silver and copper lustres on semi-opaque, predominantly alkaline glazes on Samarra clay-body. Iraq, 9th century.

A. (upper left) Non-lustrous brown and yellow, only lightly reduced.

B. (upper right) Green, amber, and brown lustres, reduced for longer but lightly.

C. (lower left) Copper-red, greenish amber and silvery lustres with vapour-flashing, resulting from stronger reduction.

D. (lower right) An unusual sherd: iridescent black with orange vapouring at the edge and a brilliant silvery-gold. Author's collection. See page 21

II. Bowl with turned-out rim, 14.2 cm wide and 5.2 cm high: flecky lustre on opaque glaze. The ornament resolves itself into a vase of flowers or a fountain surrounded by patterns in at least three lustre pigments. The fine lines marking out the composition are clearly visible. Iraq, 9th century. Keir Collection, Ham, Richmond, England. See page 24





III. Two aspects of a tall jar, 28.2 cm high; lustre on tin-glaze. Two figure panels alternate with birds of good omen, conveying honour and fortune. Iraq, Abbasid period, 10th century. Courtesy of the Freer Gallery of Art, Smithsonian Institution, Washington D.C. See page 35



IV. Bowl, 35.9 cm wide and 9.9 cm high; lustre on tin-glaze. The inscription by the lute-player's head is an incomplete phrase, 'Trust in God and ...' ('He will be sufficient for you').

The base (Plate IVB) is inscribed *Baraka* ('Blessing'). Iraq, Abbasid period, 10th century. Courtesy of the Freer Gallery of Art, Smithsonian Institution, Washington D.C. See page 35





V. Bowl, 23.7 cm wide: lustre on tin-glaze. The cock-fighters are probably not a scene from popular life, but are one of the many entertainments enjoyed in the court circle. The drawing, left in reserve against a lustre ground, is an unusually descriptive example of a rare convention. Egypt, 11th–12th century. *Keir Collection, Ham, Richmond, England. See page 44*

VI. Bowl with a strong rim, about 26 cm wide: lustre on tin-glaze with a lute-player and a large pot suggesting good living; a vigorously painted and warmly human version of the same theme as Plate 22. Egypt, 11th century. *Islamic Museum, Cairo. See page 47*



VII. Fragmentary dish, about 20 cm wide: the rabbit is painted in copper-manganese pigment on tin-glaze and the colour has been changed by vapour-fuming and partial reduction, perhaps accidentally. Egypt, 11th century. *Ashmolean Museum, Oxford. See page 47*



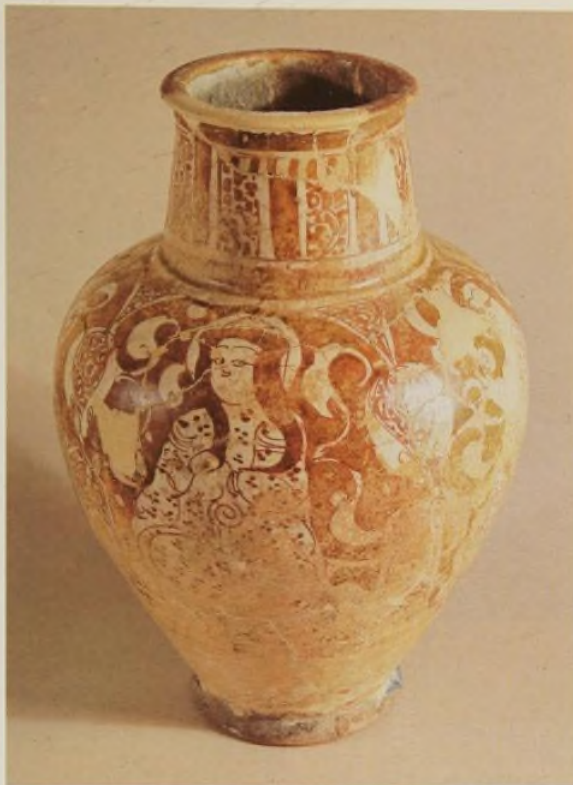
VIII. Flask with broken neck, about 20 cm high: red copper lustre on thick clear glaze. The pigment has become partially vaporous in the firing and stained some areas within the painted design. Syria, between 1180 and 1250. *Ashmolean Museum, Oxford. See page 54*



IX. Large jar, 40 cm high: clear cobalt-blue glaze over light clay, painted with an inscription and bands of arabesques in silver-amber lustre with green and red interlucence. Found at Trapani, Sicily. Probably made in Damascus, first half of 14th century. *By courtesy of the Victoria and Albert Museum. See page 55*



X. Dish with broad rim, 35.2 cm wide. Soft brown-amber lustre on tin-glaze and deep-blue glaze on the back. A descriptive, monumental image, possibly the work of Egyptian lustre-painters living in Kashan. Mid-12th century. Keir Collection, Ham, Richmond, England. See page 60



XI. Tall vase, 28 cm high: lustre on tin-glaze and blue inside. The form was probably made in three stages (see page 74). A type of vase quite often made at Kashan. The painting, like the subject itself, is comfortable and easy-going. Kashan, early 13th century. Ashmolean Museum, Oxford. See page 60.



XII. Vessel in the form of a seated man with a drinking-cup, 19 cm high; amber lustre over blue glaze and opaque tin-glaze. The human and animal figures of painted decoration were sometimes translated into pottery vessels in their own right, always with luxurious associations. Kashan, early 13th century. Reproduced by permission of the Syndics of the Fitzwilliam Museum, Cambridge, from the Ades Loan Collection. See page 66



XIII. Spouted ewer, 17.3 cm high; lustre on tin-glaze. Kashan, early 13th century. Reproduced by permission of the Syndics of the Fitzwilliam Museum, Cambridge, from the Ades Loan Collection. See page 66



11. Bowl, 27.9 cm wide and 7.6 cm deep; flecked golden-amber lustre on tin-glaze, showing a camel with a banner, carrying the qubbah, or shrine, containing a sacred object. Iraq, 10th century. Founders' Society Purchase, Membership Fund, Detroit Institute of Arts. See pages 31 and 35

mental as visual images: what they signify was at least as important as what they portray.²

They conveyed good fortune, the traditional message of the winged lion, the hare, and the peacock, for instance. But they signified something more: not only a personal greeting such as a ruler might give to his vassal, but also a more elemental favour, indicated by inscriptions such as *baraka* (blessing), *tawakkul* (trust in God), and *al falak* (the heavenly realm). Yet they were essentially court objects, without religious connotations. Figurative imagery of this kind would have been unthinkable in an Islamic religious setting. They invited participation in the court, whose success and power showed that it was smiled upon by forces more than human, and was able to communicate its good fortune to those within its orbit.

² For this chapter generally, and for the court cycle in particular, see E. J. Grube, *Islamic Pottery of the Eighth to the Fifteenth Century in the Keir Collection*, London 1976.



12. Small bowl, 12.7 cm wide, found at Fustat: flecked amber lustre on opaque glaze, with arabesques and a pot with a handle. Iraq, 9th–10th century. By courtesy of the Victoria and Albert Museum. See page 31



13. Small bowl, 15.3 cm wide: greenish-amber lustre on opaque glaze, representing a bird of good omen in a powerful abstract composition. Iraq, 10th century. Keir Collection, Ham, Richmond, England. See page 31



14. Small dish, about 15 cm wide: greenish-brown lustre on opaque glaze. Iraq, 9th–10th century. Ashmolean Museum, Oxford. See page 31

Some vessels were painted with a figure of a ruler taking his ease, others with musicians (Colour Plate IV), dancers, court attendants, seated or mounted warriors, or standing figures. A few were painted with a camel bearing a pennant, surmounting a shrine (Plate 11). This has been recognised as the sacred *qubbah*, a shrine which often accompanied a ruler in battle or at an important occasion.³

Not all the images are identifiable. A bowl in the Keir Collection, for instance, shows two bearded figures in kaftans, holding bags or purses and standing on either side of a shape which might be an island or a lake with a tree at each end.⁴ Another is a jar in the Freer Gallery, Washington, beautifully painted with two robed figures bowing, and with panels of birds and palmettes (Colour Plate III).

Most of these images were new to ceramics and were borrowed from other sources, perhaps wall-painting, or silk textiles, one of the most richly ornamented and most moveable of all forms of court imagery, or from carvings or metalwork.⁵ A parcel-gilt silver dish in the British Museum is an example of this kind of imagery. It shows a seated ruler holding a drinking-cup, flanked by a female attendant, musicians, wine-bearers, a stylised tree, a fan-tailed bird, and fruits. It is a *diwan* scene of a ruler holding court or taking his ease, and exactly the same images appeared in lustre bowls at a later date.⁶ Likewise, the figure of the lute-player, seated cross-legged, which appears quite often in lustre, is found also on the reverse of two medals made for caliphs of Baghdad in the late tenth century. It also occurred in wall-paintings at Samarra.⁷

Pottery-painters of all times have taken themes from other materials, not necessarily from choice but because it was required of them. The borrowing is not always evident because glazed vessels usually outlast the original source of the design. The yellow-gold lustres of the tenth century are the first clear instance of this borrowing process in pottery. They are the first examples in the Western world of a long and rich convention which was to branch out in Egypt and Persia into an enormous range of imagery, from simple amulets to epic and legend and allegory and mysticism.

The question naturally arises: why were these vessels made in lustre?

Today the materials and methods of ceramics are to a large extent optional. Slipware, stoneware, porcelain, burnished ware, lustre, and so on, are all open to modern ceramists because the knowledge and materials can be acquired. Obviously this was not always so, but the fact is often overlooked. There are still many good traditional potters in the world

³ See Richard Ettinghausen, 'Notes on the Lusterware of Spain', *Art Orientalis*, vol. I, 1954, p. 133 et seq.

⁴ A. Caiger-Smith, *Tin-Glaze Pottery*, London 1973, Pl. 10, and E. J. Grube, op. cit., No. 38.

⁵ John Beckwith, *Caskets from Córdoba*, London 1960 (Victoria and Albert Museum publication), contains several plates showing Syrian, Egyptian and Persian silks with animal and other decoration of eighth to eleventh-century date, a subject source for craftsmen in several media. Fig. 23 shows a silver dish with relief decoration from Persia about AD 1000, now in the Hermitage, Leningrad.

⁶ British Museum, no. 1963.12.10.3. The dish is dated seventh–eighth century.

⁷ F. Sarre, *Die Malereien von Samarra*, Berlin, 1927, p. 28, fig. 13. For a fine illustration of the subject in a dish see Esin Atil, *Ceramics from the World of Islam*, Freer Gallery Publication, Washington 1973, No. 3.

who do not know how to make a glaze or are restricted to a single technique because only a few materials are available. In the past this was the normal state of affairs. The making of lustre in the tenth century required knowledge that was new and rare: lustre and its images may have seemed little short of magical.

More than any other pottery, lustre evoked the supreme status of a ruler, of the court where the riches of the earth were gathered into one place, and of the heavenly powers without whose help the court could not have come to be. Lustre seems to move, to be alive, and to impart special virtue to an image. Is an image 'more powerful' if it shines? Many of the peoples of the world believe so even in the present supposedly rational age, and the idea seems to have been taken for granted a thousand years ago.

The figure-painted lustres were highly regarded and were sometimes sent far afield. One example was excavated from a palace-site in Brahminabad, Pakistan. It is an oval dish shaped like a dove, painted inside with a hare in dark-greenish lustre.⁸ Another, the famous fragment painted with the camel and *qubbah*, was found in the ruins of the palace of Medina Azzhara near Córdoba. This palace was for a time the seat of the Ummayyad caliphs after their expulsion from Damascus. It was built in emulation of Samarra by Caliph Abdul Rahman III in the mid-tenth century, took forty years to build, was completed about 976, and was sacked by Berber armies less than a hundred years later.

Other fragments have been found at Fustat in Egypt, together with lustre of local manufacture. It is now known as Tulunid lustre because it is believed to have been made during the rule of Ibn Tulun and his sons (877-905).⁹ The rare examples of Tulunid lustre are made of common clay instead of the fine Samarra body, and the potting and glazing is crude. The lustre pigments never achieved more than a slightly iridescent olive-green. A number of examples are to be seen in the Islamic Museum in Cairo, the best of which is a dish painted with a bird of good omen.

The Tulunids tried to rival the tastes and customs of the Abbasid court in Baghdad even though they denied it their loyalty. For the greater part of the tenth century the Egyptian lustre-makers added nothing to the lustre tradition, and the state of the country made any development almost impossible. After the death of Ibn Tulun the land fell under the nominal rule of his unworthy sons, and later under the short-lived dynasty of the Ikshidids. The building projects were abandoned and the country relapsed into chaos and was only saved from disintegration by the sultan's vizier, the Ethiopian Kafur, who had once been bought as a slave and rose to become the sole effective power in the land.

For about sixty years Egypt was raided from the West by the forces of the Fatimids, whose capital was near Kairouan in present-day Tunisia. Finally, Fustat fell in 969 to the Fatimid general Jawhar al-Siqili (the Sicilian). A new capital was begun at al-Qahira, the modern Cairo, and an immense amount of building was undertaken, affecting all the arts and manufactures, including pottery and lustre. During the following two hundred years

of Fatimid rule the old city of Fustat provided quarters for the craftsmen and artisans who made goods for the new capital a few miles to the north. A great deal of lustre was made in this period, becoming eventually very different from all that had gone before, and reflecting the interests and cultural traditions of the new dynasty and its courtiers.

⁸ British Museum, London, Museum no. 57.11.18.295.

⁹ Rudolf Schnyder, 'Tulunidische Lüsterfayence', *Art Orientalis*, vol. V, 1963.

3

EGYPTIAN LUSTRE OF THE
FATIMID PERIOD

The annexation of Egypt by the Fatimids meant more than a change of government; the population of the capital was altered by it and the daily lives of ordinary people, traders, craftsmen and artisans were closely affected. From the first years of the expansion of Islam, Egypt had been part of an Eastern empire, a vassal first of the Umayyads in Damascus and then of the Abbasids in Baghdad, and personal contacts, trading connections and cultural conventions reflected this allegiance. The Fatimids came from the West; their stronghold was in the Maghreb, approximating to modern Algeria and Tunisia, and their connections were with North-West Africa, Sicily and the islands of the Western Mediterranean. They claimed descent from the Prophet's daughter Fatima and regarded themselves therefore as the rightful territorial and spiritual inheritors of the Islamic empire, and they denied the authority of the Abbasid caliphate in Baghdad. The Sunni Muslims loyal to the Abbasids regarded the Fatimids as heretics, while to the enemies of the Abbasids, in particular the Byzantines and the many Near Eastern colonies of Christians and Jews, their arrival was a relief, especially since they were in general tolerant to adherents of other faiths, and in later years even collaborated with Christian crusaders to gain advantage over the orthodox Sunni Muslims.

The Fatimids' Western origins meant that the ideas and models for pattern and imagery required from the craftsmen of Fustat were no longer exclusively Eastern, but came equally from Greek, Roman and Byzantine tradition and from Spain and the Maghreb. Figurative imagery, in particular, became very much more important than ever before in the Islamic world, and it also underwent a remarkable change of mood. Whereas in the Eastern tradition figures had been first and foremost symbols or emblems, Fatimid taste valued their lifelikeness and individuality, their movement, expression and humour. This change occurred in all the arts under the Fatimids, in painting, wood-carving, metalwork and textiles, and in other manufactures, and it is evident in the lustres.

The influences which formed Fatimid taste, however, still do not account for the extraordinary liveliness of the living images and of the calligraphy, pattern and decoration which accompanied them on so many Egyptian articles, large and small, from the vast carved wooden doors of palaces to small rock-crystal carvings and jewellery. Some special animation seems to have arisen from their very presence in Egypt, from the new economic vitality which they generated, the freedom accorded to inhabitants of the capital despite differences of race and faith, from the growth of a prosperous urban community of merchants, and from the extravagant, colourful and wayward court.

After the first two caliphs, al-Aziz and the fanatical, enigmatic al-Hakim, whose enormous unfinished mosque still occupies a large space of the northern part of Cairo, the Fatimid caliphs were little more than political puppets of their viziers, but the social influence of the court appears to have dominated art and manners to a degree that is remarkable considering the prevalence of intrigue and scandal, sinister deaths and unexplained disappearances amongst high-ranking persons. The Fatimid family and their courtiers appear to have been highly unreliable, and the objects they owned and the arts they enjoyed convey light-heartedness and optimism. So far as the artistic evidence goes, life in Cairo was fun while it lasted. The appetite for luxuries meant that although the craftsmen's patrons from time to time suffered untimely deaths, the city's craftsmen were once again actively in business. New ideas were in the air and the workshops of Fustat multiplied.

While the figurative lustres of Iraq had been made from consistent materials and rang the changes on a distinct iconographic convention, Fatimid lustres were diverse in ideas and in material, which suggests that several groups or families of craftsmen were all operating independently, responding to different kinds of demand, from inscribed presentation pieces to small pots and trinkets.

Fatimid lustres were often signed and inscribed, but only two can be closely dated. Both belong to the caliphate of al-Hakim (996-1021). One is a fragment inscribed 'the work of Muslim son of Dahān to please . . . Hassan al Hakkimī'. The other is a magnificent dish painted with panels of arabesques and formalised plant ornament, with an inscription around its broad rim in honour of Ghabur, the commander-in-chief, a post which Ghabur held only between 1011 and 1013. The dish is now in the Islamic Museum, Cairo.¹

Both these examples are indebted to earlier tradition for their design and for the lustre pigment, but both include original features. They illustrate the foundation upon which the later, lively Fatimid lustres developed, and show that changes were already taking place. The same is true of a remarkable dish painted with a bull.² The animal figure closely follows Mesopotamian models, but instead of being surrounded by panels of contour-pattern the animal stands in a clear space and is as free to move. The composition is an early version of figure designs with a new mood, evident also in a dish painted with fortune-bearing hares carrying typical Fatimid palms in their mouths (Plates 15 and 16), in the famous bowl painted with the figure of a priest³ and in detailed representations such as the large bowl painted with a wine-bearer, now fragmentary but still descriptive and gracious, which has a human interest totally absent from the older Abbasid tradition (Plates 24 and 25).

Fatimid pottery was made from coarse clays that compare poorly with the old Samarra body, and most vessels were fairly roughly made. The skill of the lustre-painters was out of proportion to the quality of the vessels on which they worked. Possibly the lustre-makers

¹ A full account of these two pieces is given by Marilyn Jenkins in 'Muslim, an early Fatimid Ceramist', *Bulletin of the Metropolitan Museum of Art*, New York, N.S. 26, 1968, pp. 359-69.

² Grube, op. cit., Col. Pl. 41.

³ Victoria and Albert Museum (illustrated in colour in Caiger-Smith, *Tin-Glaze Pottery*, Pl. B).

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The annexation of Egypt by the Fatimids meant more than a change of government; the population of the capital was altered by it and the daily lives of ordinary people, traders, craftsmen and artisans were closely affected. From the first years of the expansion of Islam, Egypt had been part of an Eastern empire, a vassal first of the Umayyads in Damascus and then of the Abbasids in Baghdad, and personal contacts, trading connections and cultural conventions reflected this allegiance. The Fatimids came from the West; their stronghold was in the Maghreb, approximating to modern Algeria and Tunisia, and their connections were with North-West Africa, Sicily and the islands of the Western Mediterranean. They claimed descent from the Prophet's daughter Fatima and regarded themselves therefore as the rightful territorial and spiritual inheritors of the Islamic empire, and they denied the authority of the Abbasid caliphate in Baghdad. The Sunni Muslims loyal to the Abbasids regarded the Fatimids as heretics, while to the enemies of the Abbasids, in particular the Byzantines and the many Near Eastern colonies of Christians and Jews, their arrival was a relief, especially since they were in general tolerant to adherents of other faiths, and in later years even collaborated with Christian crusaders to gain advantage over the orthodox Sunni Muslims.

The Fatimids' Western origins meant that the ideas and models for pattern and imagery required from the craftsmen of Fustat were no longer exclusively Eastern, but came equally from Greek, Roman and Byzantine tradition and from Spain and the Maghreb. Figurative imagery, in particular, became very much more important than ever before in the Islamic world, and it also underwent a remarkable change of mood. Whereas in the Eastern tradition figures had been first and foremost symbols or emblems, Fatimid taste valued their lifelikeness and individuality, their movement, expression and humour. This change occurred in all the arts under the Fatimids, in painting, wood-carving, metalwork and textiles, and in other manufactures, and it is evident in the lustres.

The influences which formed Fatimid taste, however, still do not account for the extraordinary liveliness of the living images and of the calligraphy, pattern and decoration which accompanied them on so many Egyptian articles, large and small, from the vast carved wooden doors of palaces to small rock-crystal carvings and jewellery. Some special animation seems to have arisen from their very presence in Egypt, from the new economic vitality which they generated, the freedom accorded to inhabitants of the capital despite differences of race and faith, from the growth of a prosperous urban community of merchants, and from the extravagant, colourful and wayward court.

After the first two caliphs, al-Aziz and the fanatical, enigmatic al-Hakim, whose enormous unfinished mosque still occupies a large space of the northern part of Cairo, the Fatimid caliphs were little more than political puppets of their viziers, but the social influence of the court appears to have dominated art and manners to a degree that is remarkable considering the prevalence of intrigue and scandal, sinister deaths and unexplained disappearances amongst high-ranking persons. The Fatimid family and their courtiers appear to have been highly unreliable, and the objects they owned and the arts they enjoyed convey light-heartedness and optimism. So far as the artistic evidence goes, life in Cairo was fun while it lasted. The appetite for luxuries meant that although the craftsmen's patrons from time to time suffered untimely deaths, the city's craftsmen were once again actively in business. New ideas were in the air and the workshops of Fustat multiplied.

While the figurative lustres of Iraq had been made from consistent materials and rang the changes on a distinct iconographic convention, Fatimid lustres were diverse in ideas and in material, which suggests that several groups or families of craftsmen were all operating independently, responding to different kinds of demand, from inscribed presentation pieces to small pots and trinkets.

Fatimid lustres were often signed and inscribed, but only two can be closely dated. Both belong to the caliphate of al-Hakim (996-1021). One is a fragment inscribed 'the work of Muslim son of Dahān to please . . . Hassan al-Hakimi'. The other is a magnificent dish painted with panels of arabesques and formalised plant ornament, with an inscription around its broad rim in honour of Ghabur, the commander-in-chief, a post which Ghabur held only between 1011 and 1013. The dish is now in the Islamic Museum, Cairo.¹

Both these examples are indebted to earlier tradition for their design and for the lustre pigment, but both include original features. They illustrate the foundation upon which the later, lively Fatimid lustres developed, and show that changes were already taking place. The same is true of a remarkable dish painted with a bull.² The animal figure closely follows Mesopotamian models, but instead of being surrounded by panels of contour-pattern the animal stands in a clear space and is as free to move. The composition is an early version of figure designs with a new mood, evident also in a dish painted with fortune-bearing hares carrying typical Fatimid palms in their mouths (Plates 15 and 16), in the famous bowl painted with the figure of a priest³ and in detailed representations such as the large bowl painted with a wine-bearer, now fragmentary but still descriptive and gracious, which has a human interest totally absent from the older Abbasid tradition (Plates 24 and 25).

Fatimid pottery was made from coarse clays that compare poorly with the old Samarra body, and most vessels were fairly roughly made. The skill of the lustre-painters was out of proportion to the quality of the vessels on which they worked. Possibly the lustre-makers

¹ A full account of these two pieces is given by Marilyn Jenkins in 'Muslim, an early Fatimid Ceramist', *Bulletin of the Metropolitan Museum of Art*, New York, N.S. 26, 1968, pp. 359-69.

² Grube, op. cit., Col. Pl. 41.

³ Victoria and Albert Museum (illustrated in colour in Caiger-Smith, *Tin-Glaze Pottery*, Pl. B).



15. Dish, about 30 cm wide: greenish-amber lustre on opaque glaze, with a design of fortune-bearing hares. The base of this piece is signed. Egypt, middle or second half of 11th century. Islamic Museum, Cairo. See page 39



16. Jar with non-functional handles, about 22 cm high: golden-amber lustre on heavily crazed thick tin-glaze, with bands of decoration: chevrons, hares, zigzag and scroll, and letter-forms. Egypt, probably 10th century. Ashmolean Museum, Oxford. See page 39

did not make their own vessels at all, but simply purchased glazed ware and decorated it with their special pigments. This would explain the diversity of clays and glazes found in Egyptian lustre. The majority of examples are of yellow-buff clay, but red clay vessels with coatings of white and coloured slips are also known, and some pieces are made from clays fortified with glass-frit. At first cloudy alkaline glazes were most often used; later, opaque tin-glaze was commonly used for lustre ware, but clear and coloured glazes occur, and also glazes of opaque turquoise, sky-blue and green. The industry was free and unsystematic, and ranged from crudity to brilliance. That the lustre-makers purchased ready-glazed ware seems all the more likely because Egyptian lustre scarcely ever incorporates any other colours, such as the blues and greens used at a later date in Syria, Persia and Spain. The application of those colours involved the decorators in the processes of glazing and firing, whereas the painting and firing of lustre was a separate operation.

Colour, and especially the 'fortunate' golden range of sun-colours, was of prime importance for the lustre images, and the sombre Tulunid greenish-amber lustre colours were eventually superseded. At some period, probably around the middle of the eleventh century, the lustre colours became warmer, the reflections more brilliant and the convention moved into a higher key. Golden, orange and red-gold lustres were now desired, complementing the lively, life-enhancing images. When the Persian traveller Nasir-i-Khosrau visited Cairo in 1047 he recorded in his diary 'In Misr . . . they make bowls, cups, plates and other vessels. They decorate them with colours like those of the woven fabric called *Bakalimun* (shot silk).'⁴ Since the older, quiet lustres are unlikely to have invited this comparison, it is probable that the golden and orange-gold lustres typical of the Fatimids were already being made by the time of his visit.

Datable examples of Fatimid lustre are rare, but one group stands out, namely the dishes mortared into the walls of the churches of San Sisto, Sant'Andrea and San Zeno in the Italian city of Pisa. The construction of these churches is well documented. San Zeno (Plate 19) was built in stages during the eleventh century; San Sisto was built between 1080 and 1130, and Sant'Andrea belongs to the beginning of the twelfth century. Each was ornamented with pottery bowls mortared into the walls during the construction, and some of these bowls or *bacini* are of orange-gold and reddish Fatimid lustre (Plates 20 and 21). Their presence in Pisa indicates that the brighter, sun-colour lustres were certainly being made by the end of the eleventh century and probably earlier, since it is unlikely that the Pisan examples are the very first to have been made, or that they reached Italy hot from the potters' kilns.⁵

It has been estimated that as much as ninety per cent of the decorated pottery made

⁴ Quoted by Lady Evans in *Lustre Pottery*, London 1920, p. 11, where references to the text itself are given. (The English text is abridged and this passage is only to be found in the French translation.)

⁵ See the detailed study of the Pisan *bacini* by G. Berti and L. Tongiorgi, *I Bacini ceramici medievali delle Chiese di Pisa*, Rome 1981.

in Cairo was lustre at this time.⁶ Most of it was probably never intended for everyday use, but only for festivities. Ordinary pottery would at that time have been unglazed. The quality of the lustre varied: the best was probably made for people connected with the court; some was probably made for merchants' houses and, judging by the cursory painting on some examples, there may have been a popular market as well: the golden colours may have caused it to be valued as lucky charms or amulets are valued. The belief that lustre is lucky runs all through its history and was held on every level of society, and the population of Fatimid Cairo was especially inclined to astrology and magic.

One of the most favoured Fatimid lustre designs was based on plant forms with spiralling stems, tendrils, palmettes and spear-shaped leaves. The heart-shaped palmette with lobed edges became virtually a signature of the age (Plate 17) and is found on the most sophisticated and on some of the least accomplished lustre pieces. The designs became increasingly free from the mid-eleventh century onwards; in earlier examples the plant forms were attached to borders and radial panels and other geometric compositions; later they became lively independent motifs without any supporting structure.



17. Large jar, 35.5 cm high: yellow lustre on dull grey, perhaps reduced, tin-glaze, with a design of fishes, palmettes and knot-interlace. Egypt, 11th century. By courtesy of the Victoria and Albert Museum. See page 85

⁶ Grube, *op. cit.*, p. 126.



18 (above). Rebuilt bowl, about 22 cm wide: amber lustre on opaque glaze: a winged horse within interlace decorated with typical Fatimid palmettes. Egypt, mid-11th century. Islamic Museum, Cairo.



19 (right). Façade of the Church of San Zeno, Pisa, built in the first half of the 11th century. *Bacini* were mortared into the recesses within the arcades. See page 41



20. Bowl, 22.5 cm, wide, in the wall of the Church of Sant' Andrea, Pisa: golden lustre on tin-glaze. The punctuated spiral leaf-stem was a favourite Fatimid device, later used in Persia, Andalusia and Valencia. The bird's feathers and the patterns within the leaves were incised through the dry lustre-pigment before firing. Egypt, mid-11th century. Museo Nazionale, Pisa. See page 41



21. Fragmentary bowl, 26.4 cm wide by 7.5 cm deep, from the wall of the Church of San Sisto, Pisa: reddish-amber lustre on tin-glaze. The border repeats the Arabic word 'al-yumr', 'happiness'. Egypt, first half of 11th century. Museo Nazionale, Pisa. See page 41

This decorative tradition merged into the convention of inscriptions. The inscriptions in the two dishes made in the time of al-Hakkim are quite distinct from the decoration, but later the letter forms became floriated in a manner peculiar to Fatimid and Andalusian tradition. The bold letter forms extend into the plant ornament to make a decorative scheme encompassing the vessel as a whole. The inscription and the decorative design merged into one (Plate 23). Floriations gave letter forms a remarkable animation. They established a joyful mood, as well as conveying the dedication or message, usually for Blessings, Peace and Plenty. Lettering possessed a special potency, a stored energy, perhaps most keenly felt by those who were illiterate. It seemed to connect a design with secret forces behind everyday appearances. In all Islamic art lettering and mock-lettering had an importance far beyond the meaning of the conventional words (Plate 28).

Figurative designs were treated in different ways: usually the image was directly painted on a plain ground, but sometimes the ground itself was painted in lustre around line-drawn figures reserved in white. On occasions the painted lustre was incised with fine lines indicating drapery, fur or feathers, or simply adding ornament. The technique was simple and effective since it was easy to scratch through the dried pigment before firing. Many of these pieces are signed Sa'd and are usually ascribed to a painter of the mid-twelfth century, but it is unlikely that so many examples happen to have survived from one man.

Of all the varied elements in the Cairo lustre-painter's repertoire, designs incorporating figures of human beings and living creatures were the most important, and were produced abundantly in varying styles and quality, from caricatures to idealised portraits and descriptive drawings, and the figures were almost always animated by a sense of carefree enjoyment.

The designs of living creatures were almost certainly originally made for the court circle. Animals such as gazelles, peacocks, doves, fish, hares and harpies conveyed greetings and fortune to the user. Other emblems, such as the broad face in the centre of a bowl, symbolised the sun as the supreme source of power and beneficence, and suggested by analogy the ruler and his entourage. 'God has placed the Sun at the centre of the universe just as the capital of a country is placed in its middle and the ruler's palace at the centre of the city.'⁷

The pastimes of the court were frequently evoked in lustre through images of musicians, wine-bearers, dancers, courtiers, huntsmen and falconers (Plates 22 and 26). They were partly a description of the actual court, partly an idealisation of the court as the giver of bounty and enjoyment.

There are a few remarkable dishes in which the subjects are finely drawn in lustre and set off by a solid lustre ground. The best known is a dish painted with figures of a man and a woman holding fighting-cocks about to engage in a contest (Colour Plate V). Another represents a hawk attacking a water-bird,⁸ others depict a wrestling match, a duel with



22. Large bowl, about 36 cm wide: golden-yellow lustre on tin-glaze, with lute-player and symbols of plenty. Egypt, 11–12th century. Islamic Museum, Cairo. See page 44



23. Plate with curved rim, 22.7 cm wide: golden lustre on tin-glaze. The inscription reads 'mudafi' an', repeated. The floriated lettering and the generously rounded brush-design belong to Fatimid Egypt, 11th–12th century. Keir Collection, Ham, Richmond, England. See page 44



24. Fragment of a large bowl, originally about 42 cm wide: gold-amber lustre on opaque glaze, with an unusually detailed representation of a wine-bearer. Egypt, 11th century. Islamic Museum, Cairo. See pages 39 and 47



25. Fragment from the middle of a bowl, 12.1 cm wide: lustre on tin-glaze, representing a young man with a cup, a lovely example of the humanist, illustrative aspect of Fatimid pottery painting. Egypt, 11th–12th century. Keir Collection, Ham, Richmond, England. See page 39

⁷ Quoted by Grube, *op. cit.*, p. 133, from the *Rasa'il Ikhwan al-Safa'*; together with an extensive commentary on Islamic existentialist cosmology. Incidentally, the new capital at Baghdad, built by al-Mansur, mentioned on page 27, was laid out as three concentric circles. The Caliphs' Palace stood in the centre and four principal roads led from it to the four points of the compass.

⁸ Keir Collection, Richmond, London. Both are shown in Grube, *op. cit.*, Col. Pls. 88 and 89.



26 (left). Plate, 36.3 cm wide: golden lustre on opaque white glaze. A young huntsman with a remarkably large hawk. The unrestored part of the inscription reads, 'perfect blessing and complete favour and prosperity and happiness and safety and... good health and complete joy to the owner, may he be saved from evil.' On the base is another inscription including the words 'in Misr'. Egypt, probably 12th century. Courtesy of the Freer Gallery of Art, Smithsonian Institution, Washington, D.C. See page 44

28 (below). Bowl with cusped rim. 28 cm wide: dark, brownish lustre on darkened opaque glaze. Endless interlacing ribbons were a popular motif in the Fatimid period but here the painter made a mistake. The inscription conveys conventional greetings. Egypt, 11th–12th century. Keir Collection, Ham, Richmond, England. See page 44



27. Rebuilt bowl, about 24 cm wide: amber lustre on opaque glaze with a drawing of an elephant. Egypt, mid-11th century. Islamic Museum, Cairo. See page 47



batons,⁹ and an elephant in harness with ceremonial trappings (Plate 27). These were once thought to be subjects from popular life but have recently been reinterpreted as displays and diversions presented in the entourage of the court. They honour the ruler by commemorating his style of life.

These dishes show free-hand drawings as much as pottery decorations. There are none of the usual elisions which occur in even the best repeated designs. Historically they are remarkable: the descriptive drawing expresses a love of individuality and realistic detail and is closer to Romano-Egyptian imagery than to anything Islamic, but the touch and the mood is original.

Dishes with relatively quickly painted human and animal figures were fairly common, and an extensive collection of fragments, mirroring the human types and fashions of the time, exists in the Islamic Museum in Cairo (Figures 1–3).¹⁰ Most of them are directly painted on a plain ground and do not seem to be of adequate quality for the court. The drawing is spirited but sometimes careless and the overall design is often limp. They are 'vulgar imitations' in the true sense of the expression: popular, urban equivalents of the lustre of the privileged circle.

The modern world is so full of images that it is easy to underestimate their importance in the past. Today images are only considered to represent something. We have lost the belief that the image participates in the nature of what is represented. The figurative and decorative elements of Fatimid lustre were believed to do this and were by no means mere ornaments. They were not merely decorative, any more than the cross, the crown or the hammer-and-sickle. The image invoked the power, vitality, prowess and other qualities of the subject. This is one of the mainsprings of Fatimid lustre and of many other arts of the ancient and medieval world.¹¹

The simpler pieces of lustre were fluently painted with themes which must have been often repeated (Colour Plate VII). On the level of court pottery, however, the principal figure was sometimes skilfully portrayed in a manner suggesting that the painter was more accustomed to working on some other material. The two types of painting can be seen by comparing two examples: one is the fine fragment of the wine-bearer (Plate 24); the other is a bowl in which a similar figure is more broadly described but without the same thoughtfulness (Colour Plate VI). Both are splendid pieces, but in quite different ways.

The decoration of lustre vessels became increasingly free throughout the Fatimid era. A new sense of space and rhythm entered the designs. Unconsciously perhaps, the space was made to enhance the life and individuality of the human figures, animals, plant forms or inscriptions, as if everything had to witness some life-giving spirit. Lustre had no serious

⁹ Islamic Museum, Cairo.

¹⁰ From G. Wiet, *Album du Musée arabe du Caire*, Cairo, 1930.

¹¹ Perhaps the closest modern parallels are religious images, family photographs, and pictures of stars from films or sport, all of which are felt by their owners to be more than inanimate likenesses.



Fig. 1



Fig. 2



Fig. 3

Figs. 1–3: Details from fragments of Fatimid lustre pottery, 11th–12th century. Many of these pieces are in the Islamic Museum, Cairo. See page 47

rival: it matched the animation of the subjects and its shimmering surface gave them added vitality and movement.

The new themes in the art of the Fatimids may be partly accounted for by the dispersal of the ruling dynasty's treasure. The extravagance of the Fatimid family forced them to sell treasures in 1067 and for several years thereafter. Their treasury included gifts of state from foreign lands, especially from Persia and Byzantium. Dispersed amongst the courtiers and the wealthier families of the city, these objects introduced exotic themes to the craftsmen and artisans who used them as models for new work in metal, wood-carving, fabrics, painting and pottery.¹²

Compared with works in stone and wood, fabrics and wall-painting, lustre ware was inexpensive: it was a furnishing rather than a dominant art form. Nonetheless, the frequency of signatures shows that those who excelled in it had some individual importance. No less than twenty bowls signed by Muslim are still known. Many others are known with the signatures of Sa'd, and others with the signatures of Atabib, 'Alawi, bin-Assaji and g'afar al-Basr'.¹³ The new convention of signing lustre indicates that it was highly valued.

The favourite themes of Fatimid lustre are typical of an artistic tradition familiar to craftsmen throughout the Western half of Islam, from Syria, Egypt, Sicily, North Africa, to

¹² Oleg Grabar, *Studies in Medieval Islamic Art*, 1976, pp. 36–40.

¹³ Abd-el Rauf Yusuf, *Art and Techniques of the Fatimid Potters*, Cairo, 1962 (in Arabic).

Córdoba and Seville. Much of this art has now perished but it is still well represented by a particular category of objects that survived because of their high value and small size: the caskets of carved ivory made for the Ummayyad court in the workshops of Medina Azhara and Córdoba between AD 960 and 1050.¹⁴ Most of the themes of Fatimid lustre appear also in these caskets. Here is the same formalised interlacing plant ornament inhabited by figures of potentates and musicians, dancers, horsemen, wrestlers, lions, elephants, birds and other creatures, and floriated Kufic inscriptions. Here too is a similar mood of vitality and abundance. Both belong to the Western Islamic tradition and the artistic inheritance which had remained dormant in Egypt since the days of Roman rule, which came to life again when the Fatimids wrested the land from the Abbasids.

Though the surviving themes of Fatimid art are only a small proportion of all that once existed, they constitute a wide repertoire. Despite their vivacity they cannot all have been drawn from life, for some, like the legendary, fortune-giving harpy or the winged horse, could be seen only in the mind's eye, while lions and elephants seldom walked in the streets of medieval Cairo. These subjects were borrowed from images in other materials. Christian themes, such as the lustre fragments of Christ the King and the Baptism,¹⁵ were probably adapted from painted panels or wall-paintings.¹⁶ Coptic Christian themes were not uncommon in lustre, and they are an important reminder of how many other traditions, as well as Muslim, entered into this art which is today considered so typically Islamic.

4

SYRIAN LUSTRE

The technique of lustre is believed to have been brought to Syria by craftsmen from Fustat after the burning of the potters' quarter in 1169, that is, at much the same time as it first appeared in Persia. The first lustres in both places resembled the decorative style and imagery of Fatimid Egypt, but the clay material was different: it was a near-white siliceous paste, finer than any of the variety of clay bodies used at Fustat.

The first lustre made in Syria is known today as Tell Minis ware, after the site in central Syria where examples were first excavated in the late nineteenth century. Because of their decoration they were at first believed to be imports from Egypt but excavations at Hama later showed that a lustre industry had existed in Syria itself.¹

The typical form of lustre-painted Tell Minis bowls is unlike any of the Egyptian shapes. The bowls are delicately thrown with straight, outward-flaring sides, a flat base within, and a small, shallow, recessed foot. They are usually about 17 cm wide. The designs are mostly freely painted flowing compositions based on themes of good omen: sun-faces, fishes, crescent moons, figures of courtiers, curling leaf-scrolls, and words of invocation (Plate 29). Like Fatimid lustre the painting on the glaze was often scratched through with a pointed tool before being fired.² The glaze was sometimes whitened with tin oxide, sometimes clear, but usually looks almost white because of the light colour of the clay beneath it. The glazes were shiny and gave a sun-like brightness to the yellow-gold lustre.

These bowls were not necessarily painted by the people who made them. The lustre could have been applied some time after they were originally fired. They could have been made by Syrian potters and finished by Egyptian painters.

The Tell Minis wares are curiosities, for the fineness of the material and the workmanship stand out from the generally crude level of Syrian pottery of the time and indicate some connection with the much more advanced technique of Persia. The combination of Persian and Egyptian skills, both from outside the country, suggests that craftsmen were deliberately brought together to provide a special product for a ruler's court. This could well have occurred during the rule of Nur-al-Din (1146-74), under whom Syria became prosperous and fairly stable for the first time for several centuries. If so, the sun-symbolism which

¹⁴ John Beckwith, *Caskets from Córdoba*, Victoria and Albert Museum, London 1960.

¹⁵ Islamic Museum, Cairo. The fragment of Christ the King is illustrated in Caiger-Smith, *Tin-Glaze Pottery*, fig. 17, together with other Fatimid lustres not reproduced again in this present book.

¹⁶ The mid-twelfth century paintings of the Capella Palatina, Palermo, are a magnificent example of this wall-painting tradition of the Fatimid period, most of which has perished. Though painted for a Christian court, they are entirely Fatimid, and closely resemble some of the figures in lustre ware. Details are reproduced in colour in R. Ettinghausen, *Arab Painting*, New York 1977, 45-6 and 48-9.

¹ See P. J. Riis and V. H. Poulsen, *Hama, Fouilles et Recherches, 1931-1938*, IV, 2: 'Les Verrieres et Poteries médiévales', Copenhagen 1957, pp. 136-41 and 152-6.

² See Veneria Porter, *Medieval Syrian Pottery*, Ashmolean Museum, Oxford 1981.



29. Bowl, 20.1 cm wide by 6.5 cm high: golden-yellow lustre on shiny tin-glaze. The figures have been interpreted as being 'in the moon's crescent', an astrological good omen. This imagery, and the style of drawing, both suggest Egyptian influences, but the shape of the bowl is typical of Syrian Tell Minis wares of the later 12th century. Musée du Louvre, Paris. See page 51

is direct or implicit in much of the lustre pottery would have been distinctly appropriate.

Tell Minis lustre appears to have been made on a small scale and only for a short period. It has little in common with the lustre made in the region of Raqqa, some distance to the east on the Euphrates, from around 1200 until the Mongol invasions in 1259.

The Raqqa potteries were prolific. They produced white-slip wares with clear glazes, turquoise ware with black underglaze painting, pottery decorated with underglaze polychrome, *lakabi* wares, and articles with relief moulding, as well as common, unglazed pottery.³ Lustre was only a small part of the production. The glazed ware was made from a siliceous paste, similar to the Persian bodies but coarser and reddish-grey instead of white. The glazes were brilliant, smooth, and unusually fusible. They tended to gather in drops near the foot of the pots during firing. The greenish transparency of the clear glazes of Raqqa is very beautiful. Glazes were also stained with copper, cobalt, and manganese to give turquoise or blue, mauve-blue, and purplish-brown colours over slips and the lighter clays. They were thickly applied and they crazed. In the ground the glazes decompose easily, and excavated pottery is sometimes so iridescent from devitrification that underglaze painting is completely obscured.

Opaque tin-glazes do not seem to have been used at Raqqa, but the clear glazes produced an off-white effect on some of the lighter clays and over white slips. Coloured glazes on the same clays became rich and mellow.

³ G. Fehérvári, *Islamic Pottery*, London 1973, pp. 107-13.

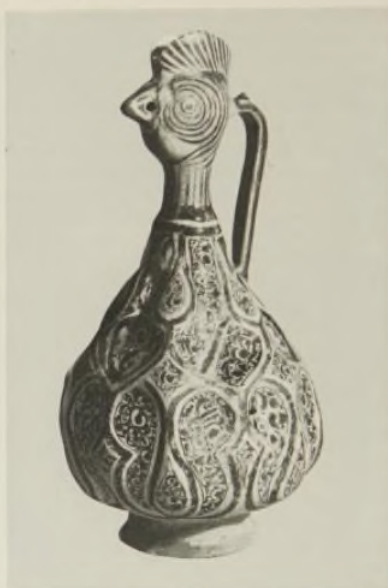
The Raqqa potters never developed fine or hard clays such as were used in Persia, suitable for vessels with delicate features or fine relief. Many of their forms were large and vigorously thrown; they include a variety of bowls, pitchers, ewers, *albarellos* and large jars, some of which were used for transporting and storing prepared fruits such as olives and green ginger. The decoration was direct and vital and the brushwork was generous.

Vessels for lustre-painting appear to have been selected from the normal production: the clay and glazes are the same as those of the unglazed ware and no special shapes seem to have been preferred. The lustre designs were similar to those painted in underglaze, and often they were combined with blue underglaze decoration in which spaces had been left for the lustre to be added at a later stage (Plate 30, A and B). The lustre-painters must



30A, B. Interior and profile of a repaired bowl about 22 cm wide: the 'star' in the centre is blue under a thick greenish clear glaze, over-painted with greenish-amber lustre. Incised inscription on the rim. Probably from Raqqa, early 13th century. Museo Nazionale delle Ceramiche, Faenza.





31. Tall bottle with bird-head, 35.5 cm high, moulded body and thrown foot: clear greenish alkaline glaze painted with reddish-brown lustre. Interior unglazed. Probably Raqqa, Syria, early 13th century. By courtesy of the Victoria and Albert Museum.

therefore have worked closely with the other craftsmen: all the different kinds of painted decoration may actually have been carried out by the same people. The designs were mostly based on plant forms, interlace, arabesques, geometrical devices, inscriptions and mock-lettering. Although the designs usually followed a geometrical, structured system that left empty spaces, few areas were eventually left unfilled. The geometric structure held together the free brushwork of the detail and also gave the forms a dignified, monumental character.

The lustre varied in colour. It was usually reddish or dark brown but was sometimes amber-yellow or silvery-grey. All these colours could arise from the same pigment. The difference was brought about by the colour of the underlying glaze and by the temperature of the firing. At slightly higher temperatures the copper in the pigment became redder, but strong reds were rare. When they occurred they were often flashed or vapoured, staining the area around the brushwork. This was probably unintentional but the effect is attractive (Colour Plate VIII).

Raqqa lustre is something of an oddity, for it does not appear to have been a court ware

as with the earlier traditions. It has no exceptional finesse, no special imagery or dedicatory inscriptions, and there were no special forms such as might have been used at court festivities.

No Syrian lustre so far found has a dated inscription, and the chronology has therefore to be deduced from excavations. The clear-glazed ware is usually attributed to the beginning of the thirteenth century and the coloured ware is considered to be slightly later. It was something new. Coloured glazes had been painted with lustre in Egypt but the colour was pale, whereas some of the most striking Raqqa lustre was on very dark glazes. A new mood was being explored, one which no longer depended on the contrast between the lustre and the glaze but on their interplay. It also allowed the painters to use vigorous brushwork without losing the unity of the vessel form. The reflections of the lustre and those of the dark glaze itself made a world of shifting half-light, quiet and mysterious. It is easy to believe that people of the time found it just as desirable as the high-key lustres of earlier traditions. The use of lustre on blue in later centuries in Spain and Italy was almost certainly suggested by Syrian examples, some of which are known to have been taken to Europe. The jar in Colour Plate IX, for instance, was found in Sicily.

Raqqa was destroyed by the Mongols in 1259. The lustre technique was never used there again but it reappeared later in Damascus, where it continued until that city was itself sacked by Timur the Great in 1401. Several large Damascus jars survive from the fourteenth century, painted with silvery-yellow lustre over blue (Colour Plate IX). One jar, believed to be of the later thirteenth century, is inscribed 'This is one of the objects made for Asad al-Askandarani: work of Yusuf in Damascus.'⁴ This Damascus lustre seems to have been higher-fired than the Raqqa wares, for it is sometimes a bright brassy yellow and contrasts more with the glaze.

Damascus jars painted in blue and black underglaze were taken to Europe during the thirteenth and fourteenth centuries and were sometimes recorded in contemporary inventories. In the West the term 'Damascus Ware' often signified lustre, which suggests that more was made than is indicated by the few surviving examples. In 1414, for instance, a potter of Manises was instructed to make a large order of 'pots a la domasquina . . . dauratos et de çafre argentatos',⁵ and in 1424 the compiler of an Italian inventory included 'un albarello lungho di Damascho o di Maiolicha'.⁶

Timur's invasion of this much-invaded country dealt the death-blow to the Syrian lustre tradition, but it lived on at one remove in Andalusia and later at Valencia. The geometrically structured designs and strong brushwork of both these traditions are reminiscent of Syrian work, as is the combination of lustre and underglaze blue. This suggests that some of the Syrian painters may have escaped to safer territories in the West.

⁴ Lane, *Later Islamic Pottery*, London 1971, p. 15.

⁵ Martí, *Cerámica del Levante español*, vol. 1, Barcelona 1944, p. 273. Two other references, from France, dated 1379 and 1416, are quoted on p. 310 of the same volume.

⁶ Gian Carlo Bojani, *Maioliche umbrè decorate a lustro*, Firenze 1982, p. 11.

5

PERSIAN LUSTRE: SELJUK, IL-KHANID, SAFAVID

It is usually assumed that the creative arts develop best in settled conditions and that the well-being of a stable and harmonious society will naturally be reflected in its artistic expression. Yet again and again, the arts have advanced in turbulent conditions; an unpredictable environment often seems to intensify the urge to possess inspiring objects and the creative instinct prefers to enjoy the time it is given rather than hope for security which may never come. The architectural and artistic achievements of the Seljuk Turks in Persia are amongst many instances.

It appears that Seljuk, a leader of the Ghuzz tribesmen in the region of Bukhara, embraced the Muslim faith some time around the year 980. Attempts were made to keep his warriors at bay by enlisting them to defend the frontier of the declining Ghaznavid empire, which comprised much of present-day Persia and Iraq, but eventually they overran the authority which employed them. Seljuk's grandson, Tughril Beg, extended these conquests by occupying much of Western Persia and Mesopotamia, and was proclaimed Sultan in Baghdad in 1055. For the next two hundred years, until they in turn were overthrown by the Mongols, his successors were almost continuously engaged in warfare to hold together the vast terrain which they had won. Yet within the system of military fiefs by which the empire was governed, provincial rulers and their dependants were bountiful patrons and the thread of continuity among artists and craftsmen, master-to-pupil, was so strong that Persian metalwork, silks, and ceramics reached new levels of expression in new techniques and ideas. Despite the uncertain frontiers, and perhaps even because of them, the arts of the Seljuk Turks are animated by a lyrical grace which extended far beyond the time and the people for whom they were originally made.

Persian lustre began under the Seljuks around the middle of the twelfth century and reached its highest development in the first two decades of the thirteenth.¹ Production was checked by the Mongol invasions between 1224 and about 1250 but the technique was not lost. Lustre indebted to Seljuk tradition, but gradually changing in style and idea, was made under the Mongol dynasty of the Il-Khanids, mostly between about 1260 and 1340. A distinctly different kind of lustre was made under the Safavid dynasty from about 1650 to some time in the later eighteenth century.

¹ The subject is treated in detail in O. Watson, *Persian Lustre Ware*, to be published by Faber and Faber, 1985, and I am grateful to Dr Watson for allowing me to study his typescript in advance of publication.

Seljuk Lustre

The lustre technique was probably brought to Persia by craftsmen from Fustat during the decline of the Fatimid dynasty about the middle of the twelfth century. Early Seljuk lustre closely resembles the style of Fatimid painters, and since the earliest-known dated piece² is highly accomplished, it seems likely that the technique was introduced by experienced craftsmen. The immigrants are usually referred to as potters. In fact, they may not have been potters at all, but specialist painters working with lustre on pottery made by local craftsmen.

Seljuk lustre brought together two techniques that already had a long separate history. One was the knowledge of lustre pigments, the ability to draw and paint with them, and the secret of firing the kilns to develop the 'golden' colours. The other was the tradition of the White Wares that developed under the Seljuks during the preceding hundred years. The White Ware technique was not new: it had been used for moulded ceramics in ancient Egypt, and to a limited extent for wheel-made vessels in Roman Egypt,³ but had never before been used so beautifully or consistently as under Seljuk patronage. These wares were not made of natural clay but of a paste containing a high proportion of quartz, some ground clear glass, and just enough plastic white clay to allow the material to be shaped on the wheel.⁴ When fired, this paste became hard and dense and sometimes slightly translucent even at an earthenware temperature of 950°. Because of its whiteness, it produced a remarkably luminous colour when covered by coloured glazes, especially blue and turquoise, and when glazes opacified with tin were used, it became whiter than any pottery known before.

The discovery that the glazes, white or coloured, could be embellished with lustre by means of an extra firing, added a new dimension to the White Ware tradition. Those who painted and fired the lustre need not have known much about the making and firing of the glazed vessels. They were simply adding an extra phase to an existing tradition.

This may explain why no vessel forms were used solely for lustre. Had the lustre-makers made their own pottery there would almost certainly have been some difference between the forms of lustre ware and those of other vessels.

Though lustre has been found in many parts of Persia and was also exported to Syria and Egypt, it was probably made only in a single centre. There are several reasons for supposing that the manufacture was concentrated. Lustre needed specially prepared materials not used in any other kind of pottery, in particular silver, which was unusually

² A fragmentary bottle dated 1179, now in the British Museum. Lane, *Early Islamic Pottery*, Pl. 52b, and Charleston, *World Ceramics*, fig. 234.

³ For example, a glazed 'faience paste' bowl painted with manganese brown, copper turquoise and cobalt blue, attributed to the first century AD, Victoria and Albert Museum, C.208-1926. For pre-Islamic siliceous-paste wares, see C. K. Wilkinson, *Nishapur Pottery of the Early Islamic Period*, New York 1973, pp. 259-71.

⁴ Allan, Llewellyn and Schweitzer, op. cit., p. 171. The chemical analysis of a fired sherd, given on p. 169, reveals a remarkably high silica content: SiO₂: 94%; KNaO: 3-2%; Al₂O₃: 1-2%. The scholar Al-Biruni, writing before 1048, referred to the use of a quartz paste by potters in north-east Persia.



Fig. 4. Vessel forms: Persian lustre of the late 12th and early 13th century

A B C Bowls, usually between 12 and 20 cm wide
 D Jug form, about 10 cm high
 E Ewer form, about 25 cm high
 F Pitcher, about 30 cm high
 G Jar, about 22 cm high

scarce in Persia at that time. The painting demanded a special skill, and the firing followed a different programme from all other kinds of ceramics. The costliness of the designs shows that lustre was made for the more affluent sections of society and for distribution to other lands, not for local markets. To judge by later practice elsewhere, it is also possible that the details of the manufacture were deliberately kept secret amongst a few close-knit family groups.

Kashan is the one city in which lustre is definitely known to have been made. It is the source of a large number of excavated sherds and is also mentioned in many signed and dated pieces from 1202 until 1339. Rayy, Sava and Jurjan have often been mentioned as possible sites of manufacture, but attributions to these cities have never been substantiated. In a thesis condensing a great deal of research, Dr Oliver Watson has shown that the evidence at present available indicates that all Persian lustre originated from workshops in Kashan.⁵ Differences hitherto taken to indicate various places of origin are explained by changes in style and technique that naturally occur over a period of several generations, and by the co-existence of different workshops each with its own speciality.

It has usually been assumed that lustre-makers from Fustat went to Persia because of the poverty and unrest in Cairo as the Fatimid dynasty neared its end. This may be partly true. But, paradoxically, they may also have been drawn to Persia because of the declining economy of the Seljuk empire itself. By about 1100 silver had become scarce and the traditional silver vessels of the nobility were being replaced by bronze vessels inlaid with silver, and by cast or beaten brass resembling gold. In the metalworking centre—Herat—the styles became much more elaborately ornamented to compensate for the less costly materials.⁶ Lustre-making began in Persia soon afterwards; though luxurious in comparison with other clay products, lustred pottery was a less costly equivalent for vessels inlaid with silver. The use of lustred pottery instead of metalware may explain why so many of the clay shapes, especially dishes, ewers and basins, follow metal forms, and why at first sight the figurative ornament and its supporting designs look very similar to compositions on metalwork. Though the designs and imagery differ considerably from those on metal, the richness, the golden glitter and the underlying association with the light-giving sun belong to both. Sun-symbolism was emphasised by the craftsmen and mattered to the patron.⁷

Dr Oliver Watson⁸ distinguishes between three principal phases in the lustre of Kashan: first a strong 'Monumental' style based on Egyptian types; then a 'Miniature' style which was an attempt, only partially successful, to produce a lustre version of the decorative figures and ornament of book illumination and the polychrome *minai* enamels. In the last decade of the twelfth century he sees the development of the supremely successful Kashan style,

⁵ Oliver Watson, 'Persian lustre-painted pottery, the Rayy and Kashan Styles', *Trans. Oriental Ceramic Society*, 40, 1973-5.

⁶ J. W. Allan, 'Silver: the Key to Bronze in Early Islamic Iran', *Kunst des Orients*, XI, 1-2, 1976-7, pp. 5-22.

⁷ For sun symbolism in inlaid metalwork, see J. W. Allan, *Islamic Metalwork in the Nuhad Es-Said Collection*, London 1982, where many examples are analysed.

⁸ Watson, *op. cit.* footnote 5, p. 12.



Fig. 4 Vessel forms: Persian lustre of the late 12th and early 13th century

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 F Pitcher, about 30 cm high
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 I Ewer, about 25 cm high
 J Jar, about 22 cm high

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ideally suited both to the technical potential of lustre and to Persian taste. His classification is followed in the remainder of this chapter.

The lustre of the Monumental style is lower in key than that of the later periods. The earliest dated example, the bottle dated 1179, is painted over an opaque tin-glaze, with lustre made from a blend of silver and copper, of a subdued orange-brown colour. The earlier lustres glow rather than shine; they have a mellow warmth, quieter but subtler than the lustres of the thirteenth century. The strength and colour of the lustre often vary from place to place on the same vessel. Reddish-orange is most usual, but it can also be brownish-amber, yellow-brown, and sometimes there is a greenish tinge. The quietness of the lustre is partly a consequence of the glaze surface, satin-like rather than shiny. The glaze was based on the traditional clear soda-frit, used with variations on most of the White Wares, and it was usually opacified by tin oxide, introduced into the frit as lead-tin 'ash'. This increased the cost and therefore tin glazes were usually applied only to the visible surface: hollow ware was often covered inside only with a clear, yellowish glaze. Alternatively, the inside was sometimes glazed clear dark-blue, as were the backs of bowls and dishes. Occasionally vessels were glazed with alternating panels of white and blue glazes, both of which were painted with lustre, giving a kind of sunlight and moonlight effect. This shows, incidentally, that the intention was not simply to imitate inlaid metal, on which such effects were impossible; lustred pottery was evidently already valued in its own right.

The subdued lustres continued up to about 1190, following the Egyptian methods and conventions. An example is the magnificent dish painted with a warrior and a leopard, in gentle, mellow lustre (Colour Plate X). But for the Turkish face of the warrior the piece could well be thought to come from Egypt. In the Monumental style the dominant figures are drawn with careful regard for realistic detail. The images matter, but the compositions as a whole are permeated by a rhythmic feeling in harmony with the roundness of the vessel (Plates 34 and 35).

These lustres are based on drawing. The lustre that catches the eye is really only the background. On the hard surface of a fired glaze the decorators could work with some kind of pen. The design was first drawn in delicate, rhythmic line and then the surrounding areas were filled in. The method had been used before in a few remarkable Fatimid lustre pieces. In Persia it was extensively used for fine lustre, both in the Monumental style and in the later Kashan style (Plates 32A, B and 43). It allowed the painters to describe details of figures, clothing, gesture and facial expression, in fine lines visible only at close quarters, but the solid ground had a carrying power over a distance. The happy convention of surrounding the heads of the figures with a halo (a sign of distinction, not of sanctity as in Christian art) made it possible to give each one an appropriate head of hair, usually solid colour for dark hair, while still distinguishing the head from the background (Colour Plate XI).

The Miniature style, which was favoured during the last decade of the twelfth century, seems to have been a reaction against the early lustres, in favour of something more delicate and was probably inspired by book illustration (Plates 37 and 38). In this style, the figures



32 A, B. Interior and profile of deep-footed bowl, about 22 cm wide: soft tawny-amber lustre on opaque glaze. Kashan, probably late 12th century. Ashmolean Museum, Oxford. See page 60.



33 Large ceremonial ewer, 36.2 cm high: yellow-golden lustre on tin-glaze. The inscriptions are framed by eight snake-dragons whose heads meet on the shoulder of the form. The entire form with spout, flared collar, straight handle, and the bird poised at the top, is like metalwork. Kashan, late 12th or early 13th century. Musée du Louvre, Paris. See page 59



34 Small bowl, 12.5 cm wide by 6.2 cm deep: light opaque blue glaze with lustre varying from red-gold to greenish-amber. A Kashan bowl with a design reminiscent of Fatimid Egypt. Kashan, 3rd quarter of 12th century. Musée du Louvre, Paris. See page 60



35 Large dish, about 42 cm wide: dull reddish lustre on thick opaque blue glaze. The figure comes from the Fatimid-Egyptian convention, and the dish may be an early, partially experimental work from Kashan. Lustre on opaque blue glazes was usually dull and subdued and it is hard to believe it was meant to be so. Kashan, second half of 12th century. Ashmolean Museum, Oxford. See page 60



36 (left). Detail of lustre-painted figure on a large jug, showing the original line-drawing and the solid areas of infilled colour. Kashan, about 1200. *Courtesy of the Freer Gallery of Art, Smithsonian Institution, Washington, D.C. See page 65.*



38 (above). Bottle, 30 cm high: red-brown lustre, barely metallic and perhaps over-fired, on lead-alkaline tin-glaze. A popular Kashan design with figures and ornament probably derived from book illustration. Early 13th century. *Reproduced by permission of the Syndics of the Fitzwilliam Museum, Cambridge, from the Ades Loan Collection. See page 60.*



37. Beaker with handle, about 10 cm high: reddish-amber lustre on tin-glaze. A conventional design of the Miniature style, painted with arresting delicacy on a fine form. Kashan, late 12th century. *Museo Nazionale delle Ceramiche, Faenza. See page 60.*

and much of the ornament are painted direct and the ground is left clear or white. Only the subsidiary features, if any, are painted in reserve against a coloured ground. The effect has less substance, more glitter. At its best it is light and delicate, but at its weakest the drawing is slipshod and agitated, partly because of the difficulty of drawing fine, controlled lines on a shiny glazed surface. To work properly, the lustre needed to be as brilliant as possible. Soft-fired examples in the Miniature style, in which the colour remains only an amber-yellow stain, are unsatisfactory. The convention was better suited to the *minai* technique of polychrome enamel painting. The most successful pieces have a shiny glaze and a bright lustre, probably achieved by a slightly higher firing temperature, changes whose best effects were to be seen in the Kashan style which followed from about 1200 onwards (Plate 42).

The Kashan style brought together the weight and carrying power of the early lustres and the delicacy of the Miniature style. The interplay of line and ground, positive and negative, was no longer confined to the backgrounds of the principal figures and friezes, but extended to internal areas, the patterned garments and the inner forms of the ornament (Plate 36). It introduced a subsidiary scale of pattern, extending the play of light and emphasising the faces and gestures of the principal figures. Multiple scales have a power that engages both the eye and the mind; it can be sensed in medieval Islamic architecture and in the Gothic, for instance, and the ability to see forms in positive-negative vision is one of the fundamental instincts of designers of all times. These principles were nowhere followed up more subtly than in Persia. In lustre, starting as a simple background such as the frieze of bounding animals on the bottle of 1179, they were eventually cultivated to the level of ceramic poetry, with metaphysical suggestions going far beyond mere ornament, and when the golden age of lustre was ended by the Mongol invasions they still underlay a satisfying decorative convention.

Technical changes seem to have been made at Kashan around 1200. Some lustre vessels have a denser, whiter and shinier glaze than anything made before, with a higher proportion of lead-tin 'ash'. In general the lustre became stronger in colour, more uniform and more iridescent (Colour Plate XXXA). Because of the contrast between the pigment and the white background, the painters could use an unprecedented amount of detailed drawing, and also inscriptions and fine linework scratched through the pigment with a point, a technique never before used with such finesse.

Many of these vessels are thin and most delicately made, which is often not appreciated because few people have the chance to handle them in museum collections. The potters were translating earthy substances into substantial light and air, and their work belongs to a protected, interior environment far removed from the give and take of everyday life. Its delicacy conveys an exquisite shock, bringing restraint and attention on those who handle it. For its original patrons it could become more than the furnishing of an ideal and secluded place: by changing the quality of people's sensory responses it became an active civilising influence.

The lustre pottery may have been serviceable in that it was put to practical use, but

it was certainly not functional in the modern sense of the word. The interiors of flasks and ewers were almost impossible to clean, and their delicate handles would have been adequate in metal but in clay they must have been far easier to break than to grasp (Colour Plate XIII). The elegantly kinked tubular spouts of wine vessels were entirely vulnerable and could hardly have survived more than a few good feasts; some of the elegant, small-footed containers would have fallen over at the thump of a fist; the nearly spherical bottles could only have been emptied by being turned almost upside down, and some of the bowls were so thin-walled that the turn of a thumb could have snapped them.

They were all suited to their purpose primarily in being elegant. Their impracticality was probably best known to the servants who held them and cleaned them. Functionalism in the modern sense only developed as domestic servants became scarce. It had little appeal in earlier periods. The Persian pots could be enjoyed and admired and in some cases amounted to poems in clay, both literally and figuratively. This mattered far more to their owners than their practical performance (Colour Plates XII and XIV).

The outstanding examples of lustre were made for people of high status. The famous dish in the Freer Gallery, Washington, is inscribed as the work of Sayyid Shams al Din al-Hasani in 1210, and dedicated to an unnamed amir 'the Great, the Learned, the Just, the Supporter, the Conqueror, the Victorious, the Experienced, the Champion of the Faith, the Sword of the Kings and the Faith, the One who brings victory to Islam and the Muslims, the Leader of the Kings and Sultans, the Leader of Princes . . .'.⁹

The designs of the Kashan style followed up the figure-drawing of the Monumental style, but in a more rhythmical manner, and group scenes were more usual than single figures. The interplay of line, pattern and lustre reflection was developed to the highest degree. The vessel becomes an enchanted world within which idealised personages hunt or take their ease against backgrounds of arabesques, scrolls and leafy tendrils, birds and animals. The background is more than decorative; the presences of the figures radiate outwards into a setting in which everything conspires to establish a perfect contentment.

An outstanding example is shown in Plate 41. The 'fortunate' aspect of the lustre is emphasised by the half-face of the sun over the ruler's head. The association between the sun, the ruler, and the lustrous reflection of sun-like light occurs often in lustre ware, and also in contemporary inlaid metal.¹⁰ Is this sun the visible body of the physical sun, or is it an inward sun, shining upon its devotee, who is in a spiritual sense 'enthroned' even though he may not be a worldly ruler but a wandering Sufi? The expansion of the figures into their beneficent setting makes sense in both these interpretations.

Much Kashan lustre of the early thirteenth century is imbued with this metaphysical overtone and the possibility of its double level of meaning arises from the objects themselves. The relatively humanistic figures of Fatimid lustre do not pose such a question, nor do the earlier Persian lustres of Fatimid influence. Nor are these overtones evident in the

⁹ Atil, *Ceramics from the World of Islam*, Washington 1973, No. 28 (Col. Pl.). Although Persian lustre was often inscribed, the name of the recipient is seldom included (Manjeh Bayani, *Mansour Catalogue*, ed. Fehérvári, p. 11).

¹⁰ J. W. Allan, *Islamic Metalwork*, Sotheby's, London 1982.



39. Aquamanile, 13.4 cm high: reddish-golden lustre on tin-glaze. The vessel was probably used to pour water over the hands at a banquet. The rider and chequered tree were one of the most popular decorations on quickly painted lustre pieces. Kashan, about 1200. Reproduced by permission of the Syndics of the Fitzwilliam Museum, Cambridge, from the Raymond Ades Collection.



40. Small bowl or cup, about 12 cm high: golden lustre on tin-glaze. Kashan, mid-13th century. By courtesy of the Victoria and Albert Museum.



41. Large dish, about 42 cm wide: iridescent golden-yellow lustre on tin-glaze. The imagery and the lustre support one another, for above the ruler and his attendants appears the half-face of the sun with rays of light. Kashan, early 13th century. Ashmolean Museum, Oxford. See pages 66 and 192



43. Tall ewer, 34.2 cm high: soft lustre on tin-glaze; a bird-and-scroll design in reserve on the shoulder and on the lower part of a directly-painted design in diminishing scale. Kashan, second half of 12th century. Keir Collection, Ham, Richmond, England. See page 60



42. Small bowl, about 18 cm wide: bright amber-yellow lustre with greenish iridescence on opaque glaze, forming a radial sun design. Kashan, early 13th century. Ashmolean Museum, Oxford. See page 65

Kashan lustre made after the Mongol invasions. The metaphysical aspect of the full Kashan style from about 1200 to 1220, with the double reference to an earthly court and the timeless court of the spiritual sun, is more difficult to describe than style or technique, but it is really its most important and lasting feature.¹¹

¹¹ Richard Ettinghausen once wrote 'Lustre imbues the piece with a phantom unreality and leads easily to mystic speculations about the impermanent phenomena and the permanent Absolute which are so vital to the mind of the Sufis', 'Iconography of a Kashan Plate', *Ars Orientalis*, IV, 1961, p. 60.



44. Bottle, 25 cm high: red-gold lustre on tin-glaze, with medallions of sphinxes or harpies of good omen, flanked by peacocks. Kashan, first half of 13th century. By courtesy of the Victoria and Albert Museum. See page 66

The finest pieces look as if they were carried out by specialist painters who were also book-illuminators, who perhaps also worked in the *minai* technique of enamel and gilding. The two outstanding Kashan painters, Abu Tahir bin Muhammad and Abu Zaid, are known from their signed work in both lustre and *minai*. In two rare examples, without signature, both techniques were used on the same piece.¹² Some, perhaps, also worked in designs painted in black [and] under a turquoise glaze, for some of these designs are remarkably close to lustre themes. Certain decorative details are common to both manuscripts and ceramics, for instance, the edging of painted areas with small sword-like terminals, and also designs of interlacing arabesque foliage. There might possibly have been a connection between the school of miniature painting which is said to have flourished in northern Iraq and Syria at the same period.¹³ Sometimes gold-leaf was used to surround the figures in the manuscripts and for the patterning of the robes, in a way very like that of the golden lustre in Kashan dishes.¹⁴

Nonetheless, the compositions on lustre pottery never seem to have been copied from other sources. They were newly devised by decorators and calligraphers who had access to illustrations of epic histories and legends and were able to quote from contemporary poetry, some of which occurs in its oldest surviving form on ceramic vessels. The combination of painted themes and inscriptions is sometimes strange. Conventional expressions occur quite commonly, such as 'Glory, honour, and wealth. . . . Glory, long life, and joy'; but there are also quotations from poems that are unique, and cryptic in meaning. They might be private messages, or expressions of love or loyalty, but they could also be mystical allegories. Such density of inscription is unique in the history of pottery and, unlike the inscribed ceramics of the Far East, there is seldom any obvious relation between the words and the images. The meaning may often have been mystical, for the inscriptions on some comparable metal vessels include words and imagery whose meaning was deliberately veiled so that only members of a particular Sufi circle could grasp its implication.¹⁵

While Kashan lustre pottery was connected with contemporary book-illumination, Kashan tiles were more closely related to mural-painting. A few tiles were painted with elaborate scenes of court assemblies. Some are signed. They appear to be from panels which originally fitted together as a wall-decoration.¹⁶ They are the supreme point in the tradition of tile decoration that originated from wall-painting in the ninth century. Kashan became so celebrated for its tiles that the word *kashi* or *kashani* became the usual Persian word for a tile. However, most tiles were not equivalents for wall-painting but something new, a ceramic architectural wall-covering. From about 1200 onwards, Kashan was especially famous for its large moulded tiles for mosques and other religious buildings, usually painted

¹² Discussed in Watson, *Persian Lustre Ware*, as above.

¹³ Ettinghausen, *Arab Painting*, New York 1977, pp. 161-2.

¹⁴ As above, colour plate on p. 65, showing the frontispiece of the *Kitāb al Aghāni*, completed at Mosul in 1219.

¹⁵ A. S. Melikian-Chirvani, 'Iranian Metalwork and the Written Word', *Apollo*, April 1976, pp. 277-8.

¹⁶ For example, a beautiful tile illustrated in colour by Grube, *Islamic Pottery, Ksar Collection*, No. 183, facing p. 233.

in underglaze blue and lustre over the glaze, which were sent all over Persia. Some of these were very large, and were an astonishing technical achievement. The most numerous tiles were those of the star and the cross forms, which fitted together to make a repeating design and have survived most often in shrines and mausoleums, though they were probably also used in secular buildings.

A remarkable assemblage of eight star and seven cross tiles, dated 1267 (665 AH), now in the Louvre, is painted with human figures, bears, deer, hares, a lion against the face of the rising sun, birds and plant designs. The edge of each tile is inscribed with verses of poetry (Plate 45). Though they were originally part of a large panel of decoration, each one is an individual mural miniature.



45. Assemblage of star and cross tiles, about 20 cm wide: golden lustre on tin-glaze. Each star-tile is inscribed with quotations from poems, and one is dated 1261. The animals and human figures have fortunate associations, most obviously the lion in front of the sun-face. Kashan. 3rd quarter of 13th century. Musée du Louvre, Paris.

One of the most striking characteristics of the Kashan style is the importance given to human figures. In the lustre and *minai* schools and the tile-paintings of the period, the human figure was the main motivation. Rulers enthroned or taking their ease, nobles riding out hunting or hawking, escorting princesses or bringing home captives, groups of figures assembled at court, and pairs of figures in reflective converse, appear on tiles and on every category of pottery vessel.

Many courts, especially in Europe, have mirrored themselves in their paintings and sculpture, usually with emphasis on particular individuals. The Seljuks did so in their metalwork and ceramics but, because the figures are seldom individualised, they outlive the long-dead court and retain a certain universality. The inscrutable rulers were probably never meant to represent particular rulers or their consorts. The figure on the throne is 'he who plays the King'. The image celebrates and generalises a situation. Everyone at some time enjoys the achievements, confidence or praise which come as if by natural right to 'those who are in favour with their stars'. Everyone at some time discovers the lover's enchanted garden suggested in these lustre compositions, or stands enthralled by the fishes in the midnight pool weaving a magic in their silent movement. Mirroring its life rather than its individuals, the court mirrored more than itself. Lustre is an invocation of the life-giving power of the sun, a power with which the court sought to identify itself, but which not even the court could monopolise.

The materials of Persian pottery were very carefully prepared. They are described in Abu'l Qasim's famous *Treatise on Ceramics* written in 1301.¹⁷ Abu'l Qasim belonged to the last recorded generation of the Abu-Tahir family which dominated lustre pottery-making in Kashan for at least four generations. He eventually left the family's traditional business and became a court historian at the Mongol capital in Tabriz. His description of pottery techniques follows an account of precious stones, perfumes and other substances, and he called it 'a kind of alchemy' because it describes the transformation of materials.

He lists all the materials required for the making of glazed, coloured and decorated vessels, including lustre, and describes their preparation and interactions (see page 210). He makes clear that for lustre the clear alkaline glaze was opacified with lead-tin 'ash' and that tin was otherwise rarely used in Persian pottery at that time. His description implies that the glaze was applied to the unfired clay, in which case only one firing was needed. Lustre, however, required another firing, and he calls it 'the enamel of two firings'. Abu'l Qasim also gives the following account of the preparation of the clay-paste:

If they want to compound a body out of which to make pottery objects and vessels such as dishes, basins, jugs and house tiles, they take ten parts of the aforementioned *shukar-i sanq* (quartz), ground and sieved through coarse silk, and one part of ground glass frit mixed together and one part of White Luri Clay dissolved in water. This is kneaded well like dough and left to mature for one night. In the morning it is well beaten by

¹⁷ 'Abu'l Qasim's *Treatise on Ceramics*, ed. J. W. Allan, *Iran*, XI, 1973, pp. 111-20.

hand and the master-craftsman makes it into fine vessels on the potter's wheel...¹⁸

In terms of man-hours the difference between this paste and natural clay must have been enormous. The collection, blending, screening and stiffening of this material must represent something like ten times the labour needed for common clay.

Fortified clays of this kind have been used in Persia continuously until the present day.¹⁹

Although Abu'l Qasim wrote his treatise during the Il-Khanid period, almost a hundred years after the golden age of Seljuk lustre, his formulations agree with the observed characteristics of the ceramics of that time. Like Piccolpasso in a later age, he was making a systematic record of inherited tradition. The details of the tradition were probably established little by little over a period of time. People seldom trouble to record such things until there is a danger of their being forgotten, but once a technique has evolved to maturity mistakes are likely to occur unless it is written down. Abu'l Qasim and Piccolpasso were describing the most sophisticated ceramic techniques of their age.

Surviving pottery confirms Abu'l Qasim's statement that the same clay body was used for a wide range of glazed wares. Lustred vessels must have been selected from a general stock, some of which would have been finished in other techniques, such as incised slip, underglaze or *laycardina*.²⁰ Some were fashioned on the wheel and some were moulded. From Abu'l Qasim's receipt for the clay body, one would expect it to be 'short' and lacking plasticity, as was found in recent tests on similarly prepared bodies.²¹ The shortness of the clay would have caused difficulty in throwing but not in moulding: open bodies lacking plasticity are more suitable than plastic clays for forming in or over moulds because they tend not to warp or crack as they dry.

It was probably difficult to make tall or strongly articulated forms from a single ball of clay on the wheel. The clay would easily split or slump. For this reason potters completed such forms in several stages. Ewers would start with the globular body, left thick near the base. Once the clay had stiffened a little, the pot would be inverted in a clay chuck, and the thicker part of the wall, now uppermost, would be shaped upwards and finally inwards to close the form, making a base. The foot could be formed from the same clay, or else from a ring of soft clay added immediately after closing the base. The practice of inverting the thrown form is still extensively used by potters in the Middle East, and explains several traditional features of Islamic vessels: the rounded or tapering body resting on a small base and the deep, slightly flared, foot-rings which give a poise and upward movement to the form. Once the base and the foot had stiffened slightly, the pot would again be inverted in the chuck, and a ring of clay added around the open rim of the body, large enough

¹⁸ *Ibid.*, pp. 113-14.

¹⁹ H. E. Wulff, *Traditional Crafts of Persia*, Cambridge, Mass. 1966, p. 165.

²⁰ The celebrated lustre dish in the Freer Gallery, Washington, is one of four surviving pieces from the same mould, which had twenty-nine scallops in the wall. Three were painted in lustre and the other in black under a turquoise glaze. Two of the dishes are dated, and the mould was evidently used between 1207 and 1211 (Atil, *op. cit.*, No. 28).

²¹ 'Abu'l Qasim's Treatise on Ceramics', ed. J. W. Allan, *Iran*, XI, p. 119.

to be worked upwards to make a neck and a collar. A handle could be added as the final operation. Abu'l Qasim makes clear that the pots were finally pared down to make them thin, and were rubbed smooth with wool to remove the throwing marks.

The custom of making a pot by stages forced the potters to pay attention to the articulation and proportions of the composite form. The practice may have arisen partly because of the awkwardness of the clay, and partly because many of the pots followed metal forms which were themselves composite. It is an example of the way the aesthetic and technical aspects of craftsmanship are often inseparable.

With very few exceptions, Persian lustre is always monochrome.²² Colour variations were the result of different thicknesses of pigment and glaze and of variable firing conditions. The copper and silver in the pigment could, in the coolest places in the kiln, become amber or yellow with a distinct cast of green; in the hotter parts they could become orange, golden, brownish-red and crimson-red.

It is surprising that the Kashan lustre-makers never used the technique of reduced-glaze lustre—that is, the reduction of glazes to produce an overall lustre surface. Their copper-turquoise glazes would have given such a result had they been reduced in the later stages of cooling. Whether the craftsmen did not know this, or whether they considered the effect not worth pursuing, remains an open question.

Not all Kashan lustre was of the highest quality. Some was carelessly painted by skilled workers who were in a hurry; some was by apprentices. The small star-tiles, which were not of much individual importance, were quickly and crudely painted and were produced in vast quantities. Yet, even when the execution is poor, the idea behind it is always well worked out and almost always involves the harmonisation of several contrasting elements. Although Kashan's reputation is based on its best work, there was also a trade in relatively inexpert lustre ware for which pieces were counted by the dozen, and this trade even included pots warped or cracked in firing.

Kashan suffered from the Mongol invasion in 1224, but was never sacked. Lustre continued to be made there but the production seems to have been much curtailed. Few dated pieces are known from the period 1226-42, though there are many both before and after these dates.²³ The Kashan style continued in the post-Mongol period, and the pedigree of planned designs is evident behind all but the least expert examples, but the themes are predominantly decorative, and the figures simply convey relaxation and enjoyment, and do not have the poetic overtones of the best of the pre-Mongol examples.

With the historical background in mind, it is surprising that anything at all was made during this turbulent era, yet people continued to live and learn and procreate, and travellers such as the Polos from Venice managed to travel through these lands to China. The Abu-Tahir family still held its pre-eminence amongst the lustre-workers of Kashan, and in this

²² An example is a bowl in the Barlow Collection, Ashmolean Museum 1956-33, dated AH 608 (AD 1211-12) which is mostly yellow gold but has deep-red lustre around the foot.

²³ R. Etinghausen, 'Dated Faience', in A. U. Pope, *Survey of Persian Art*, New York 1939, p. 1668.

period Abu'l Qasim himself was born. Most of Persia was overrun by the Mongols between 1219 and 1224. There was no permanent ruler until 1252, when Hulagu, the grandson of Jenghis Khan, was appointed governor and founded the Il-Khanid dynasty.

Baghdad was taken in 1258; Syria was attacked and Raqqa and Aleppo were captured in 1259–60. The Il-Khanids remained warlike and unstable and never established an organised empire comparable with that of the Seljuks whom they overthrew. Their territories eventually broke up into rival principalities on the death of Abu S'aid in 1335, and between 1380 and 1404 these were periodically ravaged by the armies of Timur, Tamberlaine the Great.

Il-Khanid Lustre

The classic pre-Mongol Kashan lustre changed gradually to reflect the tastes of the new rulers. The fear and uncertainty accompanying the Mongol invasions, the multitude of known and unknown tragedies, could not be inferred from a study of lustre ware other than through a marked reduction in the amount produced, the absence of dated pieces, and the scarcity of outstanding examples.

By the later thirteenth century the body of the paste used for the vessels had become coarser and more granular, greyish-pink rather than white. The glazes were seldom a clean, opaque white, and quite often were not opacified at all. The lustre itself was sometimes brilliant and metallic, but usually lacked the iridescence of the earlier work, and underfired examples of banana-yellow rather than golden colour are not uncommon. The later Kashan lustres mostly have a busy, rapidly painted, overall decoration punctuated by medallions with small geometric features or figures of birds or animals. The human figure seldom took a dominant place. In general, the designs followed up the less ambitious of the earlier examples, but the Kashan style survived quite recognisably until late in the thirteenth century.

The continuity is perhaps best demonstrated by the large lustre star-tiles with drawings of people and animals flanked by inscriptions. The manufacture of these tiles can be followed from dated examples from the pre-Mongol period up to 1339, with a gap between 1224 and 1250. The idea and composition scarcely changed, but the drawing became slightly heavier and the mood less lyrical. The similarities and the differences can be seen by comparing two tiles of figures in converse, very similar in composition, one dated 1211 and the other 1339. One is typically Seljuk in mood, the other Il-Khanid, including the figures in owl-feather caps.²⁴

Today, pottery vessels tend to be thought more important than tiles, but at the time the pottery may have been only a minor accompaniment to the vast production of tiles, which seems to have increased after the Mongol invasions. The lustred tile industry was important primarily because it provided embellishment for palaces, mosques and tombs, which were all expected to be long-lasting compared with pottery vessels.

²⁴ Illustrated in A. U. Pope, *Survey of Persian Art*, vol. V, plate 722, examples C and F.

The tastes of the new rulers became increasingly evident in the last quarter of the thirteenth century, in lustre vessels and tiles, and in the related Sultanabad wares painted in underglaze. Generally, pottery designs were based on a firm, symmetrical, geometrical structure: radial ribbons and star-forms, panels, arcades, central circles and clear bands of ornament, often precisely following the moulded features of lobed vessels. The subdivisions of the designs were filled with crisp, elaborate decorations of birds and animals and designs based on flowers, plants and leaves, drawn with a fine brush or pen and left in reserve against a ground of blue or green. The composition was orderly, but the animals often show delightful animation, and the foliage is rich and gracious (Plate 46 and Colour Plate XV). Occasionally humans were included, usually paired figures in owl-feather caps.



46. Bowl, about 17 cm wide: underglaze blue and green and golden-yellow lustre on clear alkaline glaze. Kashan, Il-Khanid period, late 13th century. By courtesy of the Victoria and Albert Museum.

Similar backgrounds, but of foliage only, were used between the raised relief inscriptions on the architectural tile-slabs which were made in large numbers for sites all over Persia, especially between about 1260 and 1330.

Lustre was often combined with blue or green underglaze painting. The richness of the effect seems to have mattered most: a resonant interplay of colours and clear line-drawing, pointed up with internal detail, orderly, lively and complete. As a rule the painters followed a fairly definite convention: their job was not to invent but to show figures and features that were already familiar.

One popular design stands apart from the rest. It represents a multitude of small fishes swimming inwards towards the centre of a bowl or dish (Plate 47). The design has been interpreted in different ways; it has been regarded, perhaps fancifully, as a symbol of the universal search for the One God; there is more support for its interpretation as a sun-symbol, for it appears, surprisingly, to have this connotation in metalwork,²⁵ but it could also be simply an appropriate design for a bowl containing water.



47. Shallow bowl, 23 cm wide: golden lustre on semi-opaque glaze, painted with circling fishes surrounded by a band of inscription in praise of the owner. Kashan, late 13th century. *Keir Collection, Ham, Richmond, England.*

²⁵ E. Baer, 'Fish-pond Ornaments on Persian and Mamluk Metal Vessels', *Bulletin of the School of Oriental and African Studies*, vol. 31, part 1, 1968, pp. 14-27.



48. Fragment of silk-twill with winged beasts. Images and decorative themes were disseminated in the medieval period by means of fine textiles and could be used as prototypes, as occurred with wood-block prints in Europe in a later age. Iran, 11th-12th century. *Ashmolean Museum, Oxford.*

Il-Khanid lustres and underglaze designs were probably partly derived from patterns and figures woven in silk, and they often suggest a sumptuous background of rich textiles. Marco Polo mentions numerous cities where the manufacture flourished. Silks had to be carefully designed, and were also easy to transport. Like wood-cuts and engravings at a later date, they provided craftsmen with pre-digested design ideas. Their flat designs and rich pattern could be easily translated into ceramic decoration. An example from an earlier period is shown in Plate 48.

Under the Il-Khanids lustre came to be used more as a rich accompaniment to other colours than as a dominant pigment on its own. Here too the influence of silks is evident; lustre on Il-Khanid vessels can be seen as an equivalent of the sheen of silk and of gold embroidery. The preceding tradition of court lustre had deliberately or intuitively evoked a sun-symbolism. As lustre ware became increasingly decorative the metaphysical suggestions passed away. By about 1300 lustre decoration on pottery vessels was going out of fashion, but the lustre tile industry remained active.

After 1340 little lustre was made for three hundred years, until it reappeared in a very different manner under the Safavids. Its disappearance coincided with the disintegration of the Il-Khanid empire, and may have been hastened by the Black Death which entered Persia at almost exactly that time.

Safavid Lustre

After the collapse of the Il-Khanids the lustre technique was almost forgotten, but a few isolated examples survive, mostly tiles and tombstones of poor quality.²⁶ When lustre was made again, not long after Shah Abbas I (1587–1629) established a new capital at Isfahan, it was quite unlike anything made in the medieval period.

Safavid lustre is mostly dated to the second half of the seventeenth century and the first half of the eighteenth. It owed remarkably little to previous examples, although many of them were still in existence. The forms, the glaze surface, the lustre colours themselves, and the ideas behind the decoration, were all quite different. No tiles are known.

The vessels were mostly medium-sized or small flasks, vases, spittoons, hookah-bases, bowls and dishes, all with gentle, softly modulated profiles, with little sign of being derived from metal vessels like the medieval lustre forms. The clay body was finely thrown, and is an extremely hard almost white paste containing powdered glass that often became translucent even when fired at earthenware temperatures. It was the kind of material that European ceramicists and their patrons sought after in the early eighteenth century. Though they knew of the Persian material, they did not know how it was made. Similar technical problems arose in both places, and the Persian wares are often slightly deformed because the clay body began to melt when it was fired to maturity.

Safavid lustre ware is thickly coated with an alkaline glaze with a brilliant surface. The glaze is usually clear and slightly greenish, but sometimes it was stained deep-blue with cobalt. Similar forms were glazed with a soft turquoise colour; these were usually left undecorated. Occasionally bowls and dishes were glazed white on the inside and blue on the back.

The lustre decoration consists mostly of sinuous, curving designs based on plant forms,



XIV. Ewer, about 24.2 cm high: *lajvardina* enamel and gold leaf on cobalt-blue glaze, with indescence on the shoulder caused by decomposition of the glaze. *Minai* and *lajvardina* wares were usually gilded rather than lustred. Kashan, or Sultanabad region, late 13th or early 14th century. Ashmolean Museum, Oxford. See page 66



XV. Deep bowl, 21.8 cm wide and 10 cm high: bands of underglaze blue and copper-turquoise recess in centre; an indistinct figure of a gazelle with leaves and flowers, surrounded by meander borders, palmettes and leaf-sprays, in copper-silver lustre. A brilliant demonstration of reserved design and direct painting. Kashan, Il-Khanid period, late 13th century. By courtesy of the Victoria and Albert Museum. See page 77

²⁶ O. Watson, 'Persian Lustreware from the Fourteenth to the Nineteenth Centuries', *Le Monde iranien de l'Islam*, III, Paris 1975, p. 65 et seq.

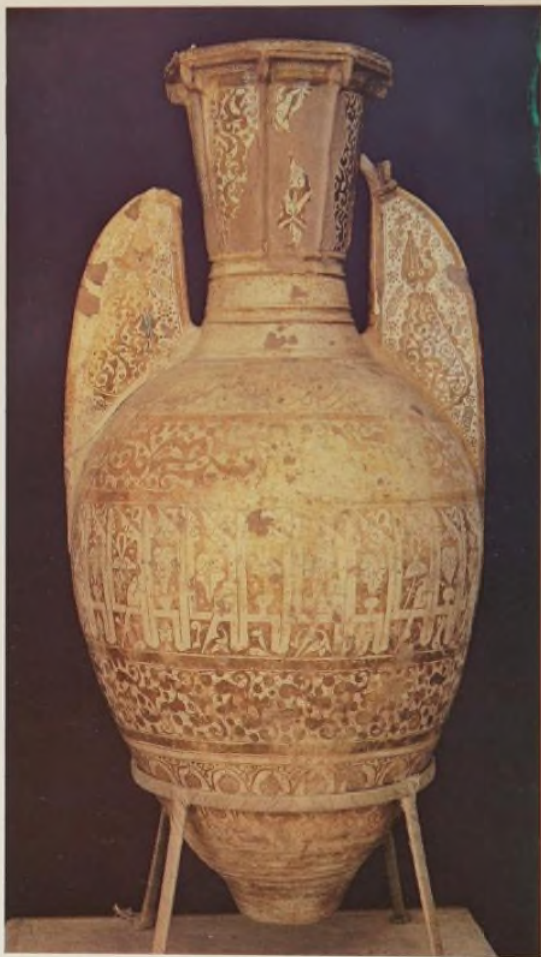


XVI. Fluted wine-flask, about 25 cm high: blue glaze over glassy white clay. A set of small lusted wine-cups would almost certainly have accompanied this vessel. It gives some idea of the sumptuous richness of Kirman lustre of the second half of the 17th century. *Ashmolean Museum, Oxford. See pages 81, 82*



XVII. Bowl on a deep foot, 23 cm wide: lustre on tin-glaze. A lovely example of decoration on three scales. The rich concentration of designs is characteristic of Andalusian lustre. Within the foot-ring is an inscription which has been read as 'Málaga'. Málaga, late 13th or early 14th century. *Museum für Islamische Kunst, Staatliche Museen Preussischen Kulturbesitz, West Berlin. See page 86*

XVIII. The Jerez vase, 126 cm high. The Kufic inscription repeats 'al-mulk' ('the kingdom'). The invocatory and protective *Khams* symbol (meaning 'five' and 'hand') has eyes, and is one of the signs of God. Málaga, first half of the 14th century. Museo Arqueológico Nacional, Madrid. See pages 90, 92



XIX. Large wing-handled vase, missing one wing, 132.5 cm high: blue and golden lustre. This must be one of the most elaborately decorated pots in the world, yet the invocatory designs have an extraordinary sense of space and tranquillity. Málaga, late 14th century. Museo del Palacio del Alhambra, Granada. See pages 90, 92





XX. Dish, 37.5 cm wide and 5 cm deep, formed over a mould: the indescent sheen of the amber lustre and the bold brushwork are typical of Catalonia in the later part of the 16th century. The blemishes occurred in the glaze firing and the painter simply ignored them. *By courtesy of the Victoria and Albert Museum. See page 123*



XXI. Dish, 34 cm wide and 7 cm deep: the 'hidden cross' design has been interpreted as the 'cross flory' of the Dominican Order and is also known in other examples. The design is less simple than it looks and the balance of colour and ground is dramatic. Valencia, about 1650. *By courtesy of the Victoria and Albert Museum. See page 125*



XXII. Fragmentary repaired maiolica dish, about 25 cm wide. This piece must have been defective and was used as a lustre trial instead of being carefully filled in. It is a lovely demonstration of the line-drawings in tones of blue which underlay Italian lustre designs. The gentle mood is typical of Deruta. Early 16th century. Museo Internazionale delle Ceramiche, Faenza. See page 135

XXIII. Maiolica dish, 38 cm wide: an early betrothal or love-dish which is not only a kind of portrait but is made by the lustre sun-rays into a benediction. Deruta, beginning of the 16th century. Museo Civico, Pesaro. Collezione Massa. See page 137



49. Bottle with silver stopper, about 26 cm high: soft-red lustre with silvery indescence on thick clear glaze, with an inscription round the base. The loose composition of floating animals and ferny plants is typical of Safavid lustre designs. This example is exceptionally animated. Kirman, second half of 17th century. Musée du Louvre, Paris.

leaves, flowers, tall pointed trees, birds, animals and, infrequently, human figures. The motifs are usually freely painted, covering almost all the available space, sometimes to the point of confusion. They are loosely composed, as if all the features were floating and never quite touch the ground, yet their consistency holds them together. They have a dreamlike, exotic character that is emphasised by the extraordinary brilliance of the lustre (Plate 49 and Colour Plate XVI).

Two pigments were used: one based on silver to give a bright golden-yellow, and the other on copper, producing soft brown-gold, red-gold, crimson and deep reddish-purple. Sometimes both were used on the same piece. Both pigments were capable of producing an astonishing depth of colour and a sheen of iridescence. This rare family of lustres stands quite apart from all others in its gentle, feminine mood.

There seems to have been no wish to imitate gold and silver, nor was there any sun-symbolism. Aided by the brilliant surface of the glaze, these lustres play upon shifts of light and colour and iridescence. Velvety and sensuous, they suggest the mystery and tenderness of the half-light and the night. Though the painting was sometimes casual, the effects were deliberate and foreseen. Over the dark-blue glaze the normal colour of the lustre changes to a range of subsidiary hues, with golden, green and blue iridescence which flashes out with every movement of the form. On most dark glazes lustre almost disappears: the high sheen of Safavid glazes enabled it to gleam distinctly (Colour Plate XVI).

The origin of these lustres still remains uncertain. They are often attributed to Kirman, though there is no evidence of their manufacture there, or indeed anywhere else. They seem never to have been made in large numbers²⁷ and could even have been the speciality of only one or two families within a single city. The forms have the rounded softness of blown glass, and some of the designs suggest silks and embroideries, but the way the decoration is fitted to the pottery forms suggests that the designs were freely adapted from other sources, if not actually devised by the painters themselves.²⁸ Perhaps they began as the response of a specialised group of potters or painters to a specific private demand, possibly for the embellishment of the women's quarters of a palace. It is curious that despite their refined and luxurious quality, there are no grand wares or showpieces such as occur in almost every other category of lustre ware. The abrasion of the surface on many examples shows that they were used and not simply kept for display (Plate 50).

The ware was evidently sought after, at least within a limited circle, for it continued into the nineteenth century, though with an inferior granular clay material, much thicker than the original composition. The potter Ustad Ali Mohamed, writing on Persian pottery methods in 1888,²⁹ did not disclose any information about lustre, although he occasionally worked with it and sold a lustre tile to the Victoria and Albert Museum in 1887. His work and the few crude pieces by other potters of the same period appear to be revivals, or even forgeries, rather than examples of a continuous tradition.

²⁷ The Victoria and Albert Museum has an unusually extensive collection of Safavid lustres.

²⁸ Dr Yolande Crowe has suggested that they are adapted from margin ornament in contemporary manuscripts.

²⁹ *On the Manufacture of Modern Kashi Earthenware Tiles and Vases*, written at the request of Major-General Sir R. Murdoch Smith KCMG by Ustad Ali Mohamed, trans. John Fargues, Museum of Science and Art, Edinburgh 1888 (also printed in W. J. Furnival, *Leadless Decorative Tiles, Faience and Mosaic*, Stone 1904).



50. Deep bowl on a foot, 18 cm wide; the alkaline glazes are transparent blue outside and clear within, painted with amber-red lustre. The peacock and flowers in the bottom have been partially defaced by wear and possibly by dilute acids in food. The effect is common in Kirman lustres and is a sign of frequent use. Musée National de Céramique, Sévres. See page 82.

6

MOORISH LUSTRE OF
ANDALUCÍA

The southern half of the Iberian peninsula was conquered in the years 711–14 by an Arab army under Tariq-ibn-Zaid, from whom the Rock of Gibraltar takes its name (Jebel-al-Tariq). Most of Andalucía remained part of Islam until the early thirteenth century and the Moorish kingdom of Granada survived until 1492. Traditions of painted earthenware pottery existed in Spain long before the arrival of any Islamic influences. The profusion of later painted ware has overshadowed the strange, vigorous painted pottery of the Iberians in the fourth to the second centuries BC, animated with figures, symbols, and other decorations of Greek and Phoenician origin. Vestiges of these designs survived in the Islamic pottery of Andalucía from the ninth century onwards. The subtlety of some of the shapes derives from the custom of fashioning vessels in several stages and joining them together, and of extending thrown forms by inverting them on the wheel and enlarging them, but in other respects the technology was not much in advance of the rest of medieval European pottery. Simple brown or green glazes were used occasionally, based on galena mixed with iron or copper, but the technical knowledge current in the Middle East did not reach Spain for several centuries.

Only near the palace of Medina Azzhara, built for the court of Abdul Rahman III (912–61), was glazed ware made regularly. The pottery was painted green and brown on a pale-buff clay under a clear glaze. The few fragments of tin-glaze pottery and lustre found on this site were almost certainly imported.

It has been claimed that lustre was made at Córdoba in the eleventh century, but there is no firm evidence of it.¹ The historian al-Edrisi wrote shortly before 1154 that at Calatayud in Aragón 'golden ware is made and sent to far-away lands',² but if this was really so the industry was short-lived and disappeared without trace. There may have been a brief production of lustre at Palma on the island of Mallorca before the Christian occupation began in 1229,³ but it did not last. The potters who brought the lustre technique to Málaga may

not have been the first to make lustre in Spain, but they were the first to establish a lasting tradition.

Excavations at Málaga have shown that by the middle of the thirteenth century, at the latest, a new kind of pottery was being made, covered with an opaque tin-glaze and decorated in cobalt-blue and golden-yellow lustre. Bowls of this type have been recognised amongst the dishes mortared into the exterior walls of the churches of Santa Cecilia and San Francisco in Pisa. These churches date from the first half of the thirteenth century and the bowls were probably set in place when the walls were being built.⁴

Malagan lustre appears to have begun so soon after the Mongol invasion of Persia that it is tempting to attribute it to the arrival of craftsmen escaping from Kashan.⁵ The historical coincidence is remarkable, but the industry is nonetheless unlikely to have originated in this way. The ware has none of the finesse of Kashan designs, and the design-ideas are different. The shapes of Malagan pottery belong to an indigenous clay tradition and are quite unlike the delicate vessels of Kashan, most of which were derived from shapes made in beaten metal. Furthermore, neither the frit-paste nor the clear and coloured alkaline glazes typical of Kashan were ever used at Málaga: Spanish pottery continued to be based on natural clays and glazes containing lead for the following five hundred years.

The origins of the new lustre industry are more likely to be found in Fatimid Egypt, where tin-glaze and lustre were used over natural clays, and there are remarkable similarities between some details of Fatimid painted designs and those of Málaga.⁶

Though Egypt suffered no turmoil comparable with the onslaught of the Mongols in Persia, the craftsmen of Fustat had sufficient troubles to make them look elsewhere for a livelihood. The town had been burnt in the siege of 1169, and when the Fatimid dynasty collapsed the craftsmen lost most of their former patrons. The Egyptian lustre tradition had virtually disappeared by about 1200.⁷ The lustre technique could have been brought to Málaga by craftsmen from Fustat, not necessarily direct but by way of Muslim settlements in Sicily, Tunisia, or Mallorca, which were all on the trade route between Egypt and Andalucía. The trade in pottery went both ways: sherds of early Málaga lustre ware have been found on the waste-heaps of Fustat and indicate a considerable commerce.⁸

By 1300 Malagan lustre was well established. In his geographical treatise written in Cairo and Damascus in 1337 Ahmed ibn-Yahya said of Málaga, 'It is famous for several industries . . . for iron work and for its golden pottery, the like of which is not known elsewhere.'

⁴ Berti and Tongiorgi, *op. cit.* This is fairly definite evidence of Andalusian lustre in the early thirteenth century. The bowls mortared into the façade of Sant'Andrea, built in the twelfth century, appear not to be Andalusian, however, but Egyptian.

⁵ A. W. Frothingham, *Lustreware of Spain*, New York 1951, pp. 21–4.

⁶ For example the Fustat lustre jar (Plate 17) of the eleventh or early twelfth century. The same fishes and the meander pattern are also found in Andalusian tradition.

⁷ See Esin Atil, *Art of the Mamluks*, Freer Gallery, Washington 1982, for an illustration of the rare lustre pottery of this period.

⁸ M. Casamar, 'Fragmentos de jarrones malagueños en los Museos de El Cairo', *Al-Andalus*, XXVI, 1961, pp. 185–90.

¹ Llubia, *Cerámica medieval española*, Barcelona 1967, p. 71, citing Gomez Moreno.

² J. F. Riaño, *The Industrial Arts in Spain* (English trans.), London 1890, p. 147. Llubia, as above, p. 65, refers to some fragments which may be from Calatayud.

³ Llubia, as above, p. 67 and fig. 80.

The Moroccan traveller, Ibn Battuta, having travelled as far as China and Sumatra, wrote after visiting Andalusia in about 1350: '... in Málaga is made a wonderful golden pottery, and it is sent abroad to far-distant lands.'⁹

From 1238 until 1492 the kingdom of Granada, founded by Muhammad ibn Al-Ahmar of the Banu Nasr family, remained the only integral Muslim territory in Spain. Never powerful in its own right, the realm survived by diplomacy and sometimes by deceit, but its court in the Alhambra Palace was famous, and its cultural significance was out of all proportion to the material resources of the kingdom. Malagan lustre pottery was first made for the Nasrid nobility. It soon became also an important export trade, and pottery was regularly sent by ship to Valencia, Barcelona, Collioure, and to more distant ports, in the thirteenth and throughout the fourteenth century. Queen Eleanor of Castile, wife of Edward I of England, imported pottery from Málaga in 1289, and it was recorded by the clerk of the port of Sandwich as '42 bowls, 10 dishes, and 4 earthenware jars of foreign colour' (*extranei coloris*).¹⁰ The Nasrid kingdom was also noted for its joinery, metalwork, carpets, textiles, leather, and architectural plaster reliefs.

Nasrid lustre had a repertoire of favourite designs from which it seldom departed. On bowls the designs were almost always arranged within geometrical subdivisions of the form of the vessel, usually horizontal bands or radial segments; on hollow forms such as jars and pitchers the divisions were made by vertical panels, arcades, medallions, and various compositions of intersecting squares or star-forms. Within the divisions were painted geometric hatched figures, palmettes, cusps, chevrons, knot-patterns, whorls, interlace, and designs based on lettering (Plates 51, 58 and Colour Plate XVII). The areas of colour and plain ground were almost always well balanced, even when the painting was poorly done. The dense and sometimes intricately involved designs witness a certain *horror vacui*, and this fear of empty space gives some of the bowls a somewhat claustrophobic mood (Plate 52). On external surfaces the designs were usually more expansive.

At first sight the Nasrid designs look simply decorative, but some of them undoubtedly had a special significance. Such were the *alafia* pattern, based on the Arabic script for Blessing or Good Fortune, and the *Khams* symbol, known as the Hand of Fatima, which could be interpreted as 'God with us'.¹¹ Others, such as the eight-pointed star, the knot patterns, and interlace, were certainly decorative but also had a symbolic undertone signifying unity or completeness, and can be interpreted as invocations of the divine presence (Plate 58). A lustre-painted gravestone found near Huelva, for instance, was painted on the front with the tree of life design, and on the back with the memorial inscription and a design of *atauriques* (Figure 9, page 110). In another context these ancient themes might have been



51. Three fragments of golden-yellow Moorish lustre on tin-glaze, the largest 19.5 cm wide. The upper left piece shows the inside of a deep, slightly splayed, foot-ring; the Arabic script can be transliterated 'Mallica' Málaga, early 14th century. By courtesy of the Victoria and Albert Museum. See page 86

52. Bowl on a small deep foot, 22.6 cm wide, 9 cm high overall, formerly embedded in the wall of the church of Santa Cecilia, Pisa: reddish lustre on opaque glaze. The centre is inscribed 'as-salama' ('peace, serenity'). The back is painted in lustre with a design of medallions. A rayed design is painted within the foot-ring. Second quarter of 13th century. Museo Nazionale, Pisa. See page 86



⁹ G. J. de Osma, *La Loza dorada de Manises en el año 1454*, Madrid 1906, pp. 33-4.

¹⁰ G. C. Dunning, 'A Group of English and Imported Medieval Pottery from Lesnes Abbey, Kent, and the Trade in Early Hispano-Moresque Pottery to England', *Antiquaries' Journal*, XLII, 1961, p. 8. See also J. G. Hurst, 'Spanish Pottery Imported into Medieval Britain', *Medieval Archaeology*, XXI, 1977, pp. 68-105.

¹¹ The symbol is discussed by R. Etinghausen in 'Notes on the Lustreware of Spain', *Arts Orientalis*, I, 1954, pp. 148-54.



53a. b. Profile and underside of bowl in Colour Plate XVII, 23 cm wide: golden lustre on tin-glaze. Málaga, late 13th or early 14th century. *Museen für Islamische Kunst, Staatliche Museen Preussischer Kulturbesitz, West Berlin.*

thought purely decorative, but there is little doubt that they were used on this memorial because they were hallowed emblems held to convey a spiritual power. The gravestone is for a young student who died on 31 March 1409. It is the only precisely dated example of Nasrid lustre so far recorded.¹²

Freely improvised designs were rare in Nasrid lustre: sacred or magical symbols cannot be invented by personal fantasy; they are inherited and have to be transmitted as faithfully as possible.

To respond only to the decorative and ingenious elements in Nasrid designs is to mistake them. Why were the blue and golden colours chosen, colours of the sky and the sun? Brown, green, and yellow could have been used instead, but they were not. Was it because blue and gold were new and rare? Or was it because they reflected the divine presence 'on earth as in heaven'? Our own age is surfeited with colours and emblems, commercial logos, advertisements, and so forth, and it is easy today to miss the importance of symbols in the works of earlier times. They arise because of a natural disposition in the uncluttered human mind to 'read' them and to establish connections between apparently separate things.¹³

Of no pottery is this truer than of the eight great vases surviving from those originally made for the Alhambra Palace. On them are gathered together most of the signs and emblems that are found separately on smaller vessels. The forms of the vases are monumental, and their dignity is not simply a matter of size: their very proportions are imposing. The painted devices are full of energy yet the forms as a whole are tranquil. The decoration includes a variety of pattern and movement, worked together with an ingenuity more often seen in fine metalwork and silk textiles than in pottery. The movement of the interconnected emblems conveys a sense of time and eternity, and of the diversity of the created world.¹⁴ In them the traditional features of the *tinaja* wine-jar, the swelling body, the upward-thrusting neck, and the wing-like handles, are taken into the realm of sculptural symbol, and there is little doubt that this was recognised when they were made.

Almost alone amongst Islamic pottery vessels, they seem never to have had any practical purpose, but to have been intended to occupy wall-niches in a palace. Such niches still remain today in the Alhambra itself and in a palace near Málaga, inscribed with verses praising the vases which once stood within them in 'metaphors appropriate to a bride'.¹⁵ The vases are almost the same height as a human being. They give the impression of guardian-presences, and few other pots in the world make such a strong physical impression.

The vases are so extraordinary that something should be said individually about those

¹² Illustrated by A. W. Frothingham, *op. cit.*, fig. 46.

¹³ A subject expanded by E. H. Gombrich in 'Visual Metaphors in Art' in his collection of essays *Meditations on a Hobby Horse*, London 1963. See also J. W. Allan, *Islamic Metalwork*, London 1982, for interpretations of symbols in inlaid metal, whose importance had hitherto been overlooked.

¹⁴ This 'message' is incorporated in the design of the floriated Kuramic inscriptions of the mural plasterwork in the Alhambra itself, described by Antonio Fernández Puertas in his as yet unpublished study of them.

¹⁵ The phrase used by Arthur Lane in 'Early Hispano-Moresque Pottery; a Reconsideration', *Burlington Magazine*, vol. 88, October 1946, p. 249.

that survive. They are by far the largest lustre pots ever made, and they are the closest that pottery has ever come to architecture. The moulding of the ribs and finials of the necks is in a quite literal sense architectural, and similar forms occur in stone and plasterwork in Andalusian buildings of the same period. The subtle proportions of the curves of the profiles, and the interplay of convex and concave form within them, all convey the same mood of tranquil power, but the vases are all different and do not follow any fixed rules (Colour Plates XVIII and XIX).

The surviving vases have often been described.¹⁶ Their dates are conjectural and are based on comparison of the designs and inscriptions with other works. Their chronological sequence, however, can be deduced from some of their own features, especially from the tendency of the profiles to become more flowing, the necks more flared, the wing-handles more emphatic; from the increasing informality of the inscriptions, the tendency for the painted designs to become looser, and the inclusion of cobalt blue in the decoration. All these considerations support one another and indicate a sequence extending over about a hundred and forty years.

1. The Osma Vase (Plate 54), in the Instituto de Valencia de Don Juan, Madrid, 120 cm high. The generous body turns in abruptly to the base of the neck, which is shorter than in later vases. The very formal decoration includes the inscription in floriated Kufic 'al-mulk lillah' ('the kingdom belongs to God') in a style of about 1270, coinciding with major building work on the Alhambra Palace. The roundels on each side of the vase are characteristic of Western Islamic art of the twelfth and thirteenth centuries. The lustre is iridescent golden-amber.
2. Vase in the Hermitage, Leningrad, 117 cm high. A band of floriated Kufic inscription surrounds the widest part of the body, with repetitions of the word 'al-afiya' ('health/happiness'); above it are medallions inscribed in reserve against a lustre ground. The handles are intact and include the *Khams* symbol (the hand) with eyes. Iridescent greenish-gold lustre. Late thirteenth or early fourteenth century.
3. Vase in the Museo Nazionale, Palermo, 170 cm high. A wide band of tall Kufic lettering around the widest part of the body, repeating 'al-mulk' ('the kingdom'), an abbreviation of the wording on the Osma vase. The form similar to the Hermitage vase but more pronounced in the shoulder and more concave near the foot. Yellow-golden lustre with a tinge of green. Late thirteenth or early fourteenth century.

¹⁶ Notably by the following: F. Sarre, 'Die Spanische-Maurischen Lüster des Mittelalters und ihre Herstellung in Malaga', *Jahrbuch der Königlich Preussischen Kunstsammlungen*, XXIV, Berlin 1903; J. Ferrandis Torres, 'Los Vasos de la Alhambra', *Boletín de la Sociedad española de Excursiones*, XXXIII, 1925; A. W. Frothingham, *Lusterware of Spain*, New York, 1951, pp. 18-63; Richard Ettinghausen, 'Notes on the Lusterware of Spain', *Ars Orientalis*, I, 1954, pp. 133-56; Balbina Martínez Caviro, *La Lora dorada*, Madrid 1983, pp. 52-88, in which all the vases are illustrated.



54. Large vase, 120 cm high, missing its original wing-handles: golden-yellow lustre on pished tin-glaze. Around the shoulder is an inscription from the Koran in floriated Kufic. The knot-patterns, arabesques and other designs all without beginning or end, on the neck, collar, and lower body not only make the vase beautiful, but praise the eternal divine presence, like the inscription itself. Probably Málaga, late 13th century. Instituto de Valencia de Don Juan, Madrid. See page 90

4. Vase in the Museo Arqueológico Nacional, Madrid (the Jerez vase), 126 cm high (Colour Plate XVIII). Low-shouldered, with taller wing-handles than the preceding vases. A broad band of elaborately floriated Kufic inscription encircles the lower centre part of the body (Plate 55). The wing-handles are painted with the *Khams* symbol, again with eyes. Yellow-gold lustre with a greenish tint. First half of fourteenth century.
5. Vase in the Museo Nacional de Arte Hispano-musulmán, Granada (the Simonetti vase), 121 cm high. The glaze has perished except on the collar and neck, which is fairly short. The remaining lustre is golden-yellow. Probably mid-fourteenth century.
6. Vase in the Nationalmuseum, Stockholm, 127 cm high. High-shouldered and tapering to a small foot; a tall, almost straight-sided neck. The surviving wing-handle is short and wide. The body is decorated with alternating wide and narrow bands of small-scale pattern comparable with contemporary woven silk, and there are inscriptions in both Kufic and cursive letter-forms. Pale yellow-golden lustre. The main inscription is a repetition of the word '*ghibtah*' ('happiness'). Mid-fourteenth century.
7. Vase in the Museo Nacional de Arte Hispano-musulmán, Granada (the Gazelle vase), 135 cm high (Colour Plate XIX). The form swells gently from a concave curve in the base and turns abruptly inwards to the base of the collar. The neck is distinctly flared and the wing-handles are larger than those of the preceding vases. Painted in cobalt-blue and iridescent golden-brown lustre, the blue under and the lustre over the glaze. Inscribed with cursive letters. About 1400.
8. The Hornos vase, in the Museo Arqueológico, Madrid, 134 cm high. The height and slenderness are emphasised by vertical panels of decoration and by the tall, slightly flared, neck. Very wide wing-handles, extending beyond the width of the body. Cursive inscriptions. Blue and iridescent brownish lustre. About 1400.

Various parts of vases also survive. The most important is the vase-body now belonging to the Freer Gallery, Washington. This was once used as a tub in a tavern in the Albaicín and most of the lustre has perished. It was painted in lustre and blue and the design includes an extensive poetic inscription. It was probably made in the early fifteenth century. The necks of three other vases of late fourteenth-century date also survive, all painted with lustre and blue.¹⁷ Another complete vase was smashed at Irún in 1936, and the upper part of a vase-body, formerly in the Kunstgewerbemuseum, Berlin, is now known only from photographs.

¹⁷ One formerly in the Hirsch Collection, now in the Museo Nacional de Arte Hispano-Musulmán, Granada; one in the collection of the Hispanic Society of America, and one in the Museo Arqueológico Nacional, Madrid.



55. Detail of shoulder of the Jerez vase (Colour Plate XVIII): golden-amber lustre on tin-glaze. The Andalusian floriated Kufic inscription resembles carved designs on walls of the Alhambra Palace. The light-on-dark of the inscription contrasts with the dark-on-light of the interlacing arabesques above and below. Málaga, first half of the 14th century. Museo Arqueológico, Madrid. See page 92

The character of the vases changed slightly during the period of their production. The five earliest vases each include a central horizontal band of Kufic inscription; the necks are almost straight-sided and the wing-handles are smaller than those that followed. The Stockholm vase with its horizontals and the Hornos vase with its vertical emphasis stand apart. Four of the later vases and fragments have decoration conceived as squares or circles that emphasise the roundness of the body. Two of the late designs include gazelles facing each other, and two have emblems formed by interlocking squares. All these differences suggest that the vases now known are survivors from a fairly extensive manufacture, an idea that is confirmed by the number of thick-walled vase fragments excavated in the grounds of the Alhambra. What other variations, lost long ago, must once have been made on this grand theme?

By the late fourteenth century new ideas were being added to the traditional emblems of Nasrid lustre: compositions including human figures, such as a pitcher painted with a huntsman and a dish painted with a knight fighting a dragon.¹⁸ Unusual though they are, there is no doubt that both were made in Andalucía. In fact the Nasrid blazon is repeated four times in the border of the dish. A number of tiles, also, were painted in lustre and blue with small human figures surrounded by interlace and a patterned border. Some of

¹⁸ Both are in the Instituto de Valencia de Don Juan, Madrid. See Llubiá, op. cit., figs. 148-9, and Caiger-Smith, *Tin-Glaze Pottery*, London 1973, fig. 35 for a large illustration of the pitcher.



56A, B. Interior and profile of large bowl, 59 cm wide: slightly matt reddish-amber lustre on tin-glaze. The flaring form, rising from a splayed foot to a strongly articulated rim are typical of Andalusia. Ship designs, the strange fish, the chevron border, the reserved arabesques and the tree of life design on the outside all belong to Islamic tradition. Only the coat of arms is Christian. Probably Málaga, late 14th century. By courtesy of the Victoria and Albert Museum.

these tiles were once in the Alhambra; others come from a church in Córdoba.¹⁹ All these are examples of a new kind of Nasrid pottery, with designs influenced by Gothic conventions from Christian Spain. It may have been traded to the Christian kingdoms, but it seems also to have appealed to the Nasrids themselves.²⁰ Some of the tiles may have been adapted from biblical illustrations, and the painted surround could be based on the cusped square favoured in manuscripts and carvings of the fourteenth century. The dish is probably a version of St George and the Dragon, and the small figure watching the scene could be the captive princess, shown as a page.

The large bowl painted with a sailing ship bearing the ancient arms of Portugal (Plate 56A and B) is a beautiful example of a popular Málaga theme of the late fourteenth century. In the old city a number of sherds have been excavated, painted with cruder versions of a similar ship. The provenance of this bowl remained uncertain for many years, until in 1983 analyses of the clay proved that it came from Málaga.²¹ This had always seemed probable, since the shape of the bowl and the tree of life designs on the exterior are entirely Nasrid, and the strange dolphins also occur in Islamic pottery designs from Egypt and



¹⁹ Now in the Museo Arqueológico, Córdoba (Llubia, op. cit., figs. 142-3).

²⁰ A. W. Frothingham, *Lusterware of Spain*, pp. 63-5.

²¹ The analyses, carried out by Dr Hughes of the British Museum, show that Málaga clay contains a high proportion of schistoid particles which are not present in clays from the Valencian region.

Sicily. The ship itself, however, had no precedent in pottery designs, and could have been painted in response to a demand in the Christian kingdoms. Ironically, it commemorates the Christian sea-power which was soon to deprive the last Moorish kingdom of much of its commerce.

Nasrid lustre is usually yellowish amber-gold with a pronounced iridescent reflection. The association between the gold and the colour of the sun was probably at least as important as its aesthetic qualities. The lustre was probably fired with intermittent reduction alternating with periods of clear, oxidised firing, for otherwise the lead in the glaze would have caused it to become slightly grey. This occasionally happened, as is seen in some sherds now in the Alhambra Museum; the lustre has become a dull red and the glaze itself a dark grey. This effect is cultivated by some modern potters in the very different context of the present day (see pages 178-9), but at the time it was not desired, and darkened vessels would probably have been discarded as wasters. In general the Nasrid lustre and glaze are so clear that it seems likely that some flux was included in the pigment, such as mercury, alum, soda, or sea-salt (see pages 205-6). By this means the lustre could be made to adhere to the glaze at a low temperature, with less risk of the glaze itself being darkened by reduction. Amber-yellow gold is the lustre colour that develops most easily from fluxed pigments based on copper and silver and fired at low temperature.

The commonest defect in Nasrid lustre was one that occurs easily with fluxed pigments, namely a slight overfiring that caused the clay medium, with which the pigment was diluted, to adhere to the glaze, dulling the metallic film. The effect is noticeable on the ship bowl, though it does not spoil it, and on the Osma vase in Madrid, and on one or two of the late vases. It is hardly surprising: the wonder is that these enormous pots were fired evenly enough to give any good lustre at all. The practical problems were somehow solved by unnamed potters over six hundred years ago, but one should still acknowledge the immense degree of specialised skill, acquired over several generations, which made these vases possible, a skill for which the modern artist-craftsman has hardly any equivalent.

Equally remarkable is the large clay tablet now known as the Fortuny panel, after the painter Mariano Fortuny, who purchased it from a *carmen* in the Albaicín, near the Alhambra, in the middle of the last century. The border contains an Arabic inscription in praise of Yusuf III, who ruled Granada from 1408 to 1417 (Plate 57). The toned ground and the brownish silver-gold sheen with blue, red, and violet iridescence distinguish it from all other known Andalusian lustre. The tablet was conceived as a kind of ceramic carpet whose border enclosed a garden of flowers and leaves interwoven with arabesques and animals. The swans and peacocks and the dragon-head terminals create a mood of refined vitality, a paradise in which the eye and the mind wander amongst the sinuous forms. It is a supreme example of the art of the harem or patio, the secluded places which have always played an important role in Arabic life and hence in Islamic arts and architecture. To glaze and refire for lustre a panel of this size would be a daunting operation even by modern technical standards.

The panel is a striking instance of the cross-fertilisation of one art by another, which



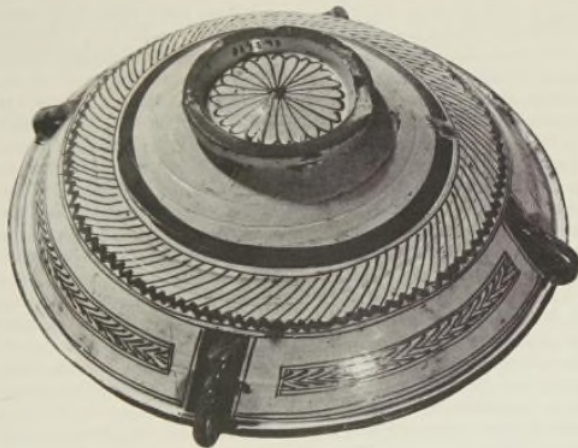
57. The Fortuny tablet, a single slab 90 by 44 cm; iridescent brownish-yellow-gold lustre on tin-glaze. The design includes swans, peacocks, and dragons' heads, and the Nasrid blazon is three times repeated. The border is an inscription in honour of Yusuf III of Granada (1408-17). The tablet was found in a house in the Albaicín, Granada. Málaga, early 15th century. *Instituto de Valencia de Don Juan, Madrid.* See page 96



58a, b. Interior and back of a very large bowl with a deep foot, about 56 cm wide. On the rim are four rope-like handles. Blue and reddish-golden lustre on tin-glaze. This is one of four similar majestic bowls, probably made at Málaga in the late 14th century. Musée de Cluny, Paris. See pages 86 and 192

happened frequently in all the Islamic arts of the court. The design closely resembles the carved frieze in the Salon de los Embajadores in the Alcázar of Seville, while similar designs, also with dragons' heads, are found in Murcian carpets of the fifteenth century.

The forms and colours of the Fortuny panel convey a mood akin to that of the Persian Safavid lustres of the seventeenth century. They suggest a nostalgic evening light, appropriate to the final years of Nasrid prosperity. Yusuf III died in 1417 leaving an eight-year-old son to succeed him; the realm fell into anarchy and economic decay from which it never recovered, and the lustre industry of Málaga seems to have come to a sudden end some time before the middle of the fifteenth century. When in 1530 a list was made describing the centres of pottery manufacture in Spain, Málaga was included only as a source of common ware, but not of lustre—an irony, since the term *obra de Malequa* was still current at Valencia as one of the names for lustre ware.²²



²² G. J. de Osma, op. cit., pp. 36-7.

HISPANO-MOESQUE LUSTRE

When Hispano-Moresque pottery came to be systematically collected in the 1860s and 1870s, little was known about the Moorish lustre of Andalucía. The best lustre was assumed to have originated in the well-known pottery town of Manises, near Valencia. Many pieces of Nasrid lustre were mistakenly attributed to Manises, and the mistakes have even now not all been corrected. This is not entirely the fault of museum curators: there are many similarities between the lustre of Christian Spain and the earlier lustre of the south from which it developed. Nasrid lustre was still shipped to El Grao, the port of Valencia, and thence to Mediterranean ports further north, even when lustre was regularly being made at Manises at the beginning of the fifteenth century.

The earliest record suggesting the production of lustre at Manises is dated 1342.¹ It refers to the manufacture of *obra de Malequa*, the name by which lustre ware was commonly known in the following century. There is some doubt about the meaning of the term in the earliest references. It obviously signified pottery of the kind made in Málaga: it might have meant lustre ware specifically, but it could also have meant tin-glaze pottery painted only in blue. In a curious document of the year 1414 a Valencian notary himself became confused about the meaning of current trade-names for pottery, and it is small wonder that they are not always self-evident today. He was making a list of pottery, and he first described the lustre ware as Manises earthenware (*operis terre de Manises*). He then erased the last word and changed it to *Malica* (Málaga). Finally, he added the word *dauratam* (gilded).² Evidently the first two terms were commonly applied to lustre ware, but also had other meanings. Despite a number of references to the production of *obra de Malequa* at Manises during the fourteenth century, therefore, it is not quite certain that lustre was being made at the time.³ The cumulative evidence of documents and of archaeology only establish that it was being regularly made by the end of the fourteenth century.

While the trade was in the hands of local merchants, much of the Manises lustre ware was actually made by Moorish craftsmen who had moved from Andalucía to work in the

relatively prosperous Christian kingdoms. The migration to the north had been going on for some time. A commission was given in 1362, for instance, by Cardinal Aubert Audouin to the Moorish master Juan Albálat (the Arabic name means 'the pavement maker') and Pascasio Martín, both of Manises, to make floor tiles of *obra de malicha* for the papal palace at Avignon. In the course of time many Moorish craftsmen adopted Spanish names, but the Arabic names of men referred to as lustre-makers in the fifteenth century leave no doubt of their origins.

An interesting work-permit of 1405 in the Valencia archives records the setting-up of what appears to have been a lustre workshop:

Mahomet Culeyman and Maymo Annaia, Moorish masters of the art of *obra de Malequa*, residents of Manises, [are permitted] to establish themselves with all their effects in the township of Murla and there to exercise their art, working in the aforesaid *obra de Malequa* for the space of five years. . . . They undertake that throughout this time they will not move away from the township nor make *obra de Malequa* in any other place without the permission of Mossen Guillem de Martorell, Lord of Murla, and they make a pledge of five golden Aragon florins in advance for any infraction of contract.⁴

Though the number of lustre-makers increased rapidly in the middle of the fifteenth century, the industry seems to have remained largely in the hands of Moorish masters. In 1484, for instance, the German traveller, Nicolas von Popplau, wrote admiringly of the blue and golden vessels 'which are made by the Moorish potters'.⁵

It cannot have been easy for artisans to leave the Muslim south and re-establish themselves in Christian Spain, yet by about 1420 their lustre was sought after not only in Spain itself but by people of the highest rank in France and Italy. The grand armorial platters such as those made for Martin I and Alfonso V of Aragon, Queen Blanca of Navarre (Plate 65), Maria of Castile, Philip the Good, Duke of Burgundy, and for many other noble families, demonstrate the Moorish masters' success, a success that they were unlikely to have achieved on their own initiative.

The intermediaries appear to have been the successive heads of the family of Buyl, whose estates were at Manises. They were courtiers as well as landowners, and were ennobled in 1385 for services to the Crown. Several members of the family served as emissaries to foreign courts, including the Nasrid court at Granada. The Don Pedro Buyl who was lord of Manises at the end of the fourteenth century, seems to have perceived the commercial possibilities of lustre ware and deliberately encouraged Moorish masters to settle on his lands. He would easily have been able to introduce their work to people in court circles, and to have arranged for new work to be commissioned. According to the researches of G. J. de Osmá, the Buyl family took a royalty of ten per cent on the sales of their tenant

¹ Frothingham, *Lustreware of Spain*, p. 83; other early references are cited in the same chapter. See also Martínez Caviro, op. cit., pp. 101-8, and Martí, op. cit., vol. 1, p. 316.

² G. J. de Osmá, *Los Maestros alfareros de Manises, Paterna y Valencia*, 1908, p. 8 (*Adiciones*, 1911).

³ Arthur Lane believed that lustre was definitely not made at Manises until about 1400. See his article 'Early Hispano-Moresque Pottery: a reconsideration' in *Burlington Magazine*, LXXXVIII, 1946, pp. 246-52. The two documents on which this argument rests, however, are not as definite as Lane supposed.

⁴ The contract is written in two versions, one Latin and one Spanish. It is quoted by Osmá, *La Loza dorada de Manises en el año 1454*, pp. 18, 19.

⁵ Osmá, op. cit., p. 20.

pottery and, in the year 1454, this amounted to between 50 and 60,000 duros, a very large sum, in the region of half a million pounds today.⁶

The Buyl family already received dues from the sale of ordinary non-lustre pottery made on their lands, and they attended to both the higher and the lower aspects of pottery production. At one extreme is the remarkable document, quoted below, from the queen, Doña Maria of Aragon, wife of Alfonso V, placing an order for lustre ware. At the other is a local record of 1392 in which Don Felipe de Buyl was involved in a lawsuit about rights of digging clay on the borders of his property.⁷

The Buyls were in a good position to appreciate the instability of the Nasrid kingdom, and it may have been easy for them to persuade Moorish masters to come to work under their patronage at Manises. Such was their success over several generations that Martin de Viciano, writing some time between 1517 and 1566, said that Don Felipe de Buyl, then lord of Manises, had two hundred houses of vassals in his jurisdiction, and he added, 'In Manises are made very fine and beautiful vessels and glazed tiles of many fashions and colours and tints, a great quantity of which are sent by land and sea to other realms, where they are highly valued.'⁸

The most remarkable commercial scoop for the Buyl family was the royal commission of 1454, which deserves to be quoted in full.

The Queen: to our noble and beloved Don Pedro Buyl.

Noble and beloved: we shall require for our use and comfort [articles of] *obra de melica* in accordance with the list we have had made which we send herewith. And we ask and charge you, with all possible affection, that of your love and duty to us, you ensure that the said work shall be made for us elegantly and finely, and we trust that you will see to it that everything forms a proper set. And suffer our request patiently, for we give you this charge knowing you to be our devoted servant, and because you are living at the very fountain-source of this industry; and we trust in God that this service you perform for us shall remain, like those you have done before, keenly in our remembrance. And when the work is completed you shall immediately inform our loyal procurator, Don Cristobal de Montblanch, whom we have commanded to notify us and write to us about it, so that as soon as it is done he shall forward it to us: indeed we would wish it already finished.

Given in our city of Borja, the 26th day of November of 1454.

Description of the earthenware desired by the Lady the Queen, which should make up a set, and should be of fine quality:

First: Two platters for water for the hands

Item: Large platters for serving and taking away victuals

⁶ Osma, op. cit., p. 9.

⁷ Osma, op. cit., pp. 9-10.

⁸ Osma, op. cit., p. 9 note.

Item: Eating plates

Item: Fine bowls for hot beverages

Item: Fine pitchers for serving water; these to be entirely golden

Item: Vases for flowers with two golden handles

Item: Mortars, half a dozen, let them be fairly large

Item: Small bowls and 'minor vessels'

Item: Bowls for making 'dry soups'⁹

Four months later, when the consignment had been delivered, the queen wrote again:

(From Zaragoza, 21 March 1455)

Noble and beloved: we have received your letter and the earthenware which you sent us, for the which we give you thanks, asking and charging you to have made on our behalf more of the same, only it should be glazed or given gold inside and outside, that is to say: six pitchers, three of them with a spout and three of them without; and six vessels for drinking water. And we would say furthermore that it is our pleasure that you show affection in serving and satisfying [our need] as befits our good servant; for we ourselves are recognisant of you in those matters which concern your advancement and honour. And convey our greetings to your lady.¹⁰

⁹ Osma, op. cit., p. 7. ¹⁰ Osma, op. cit., p. 28.



Fig. 5. Vessel forms: Spanish lustre of the 15th century

A Lidded jar with handles, about 22 cm high (*canterella*)

B Large jug, about 25 cm high

C Small jug, about 18 cm high

D Large jar, about 42 cm high (*canter*)

F Large container, about 35 cm high (*olla*)

G Jar, about 32 cm high (*bot* or *albarello*)

G Spouted jug for oil, about 26 cm high (*pond*)



Fig. 6 Vessel forms: Spanish lustre of the 15th century

- A Jug with tall foot, about 20 cm high
 B Tall jug with foot, about 34 cm high
 C Storage pot for oil or wine, about 35 cm high (*canter*)
 D Goblet, about 19 cm high (*copa*)
 E Drinking-cup, about 17 cm high (*grial*)

- F Drinking-cup, about 12 cm high (*terracer*)
 G Large pot for flowers, about 60 cm high (*terras*)
 H Jar, about 30 cm high (*pot* or *albarello*)
 I Pharmacy jar, about 25 cm high (*pot* or *albarello*)



Fig. 7 Bowl forms: Spanish lustre of the 15th century

- A Large dish, 32–45 cm wide (*plato*)
 B Large dish, 25–40 cm wide (*plato de tallador plat*)
 C Basin, about 42 cm wide (*brasero*)

- D Dish or bowl with raised centre, about 40 cm wide (*tetón*)
 E Double bowl, about 36 cm wide (*plato de la garlanda*)
 F Dish with recessed foot, about 40 cm wide (*tetón*)



59 Very large covered bowl or tureen, 48 cm wide by 57 cm high overall: blue and red-brown lustre on a mould-pressed form with low relief. The form is a large version of a traditional Moorish container, still made in Morocco. Though probably made in Manisas about 1440, the ancestry of this vast pot is entirely Moorish-Andalusian. By courtesy of the Victoria and Albert Museum.

These commissions indicate the twofold nature of Hispano-Moresque ware. It had to be spectacular and elegant, yet every category of vessel had a particular use. Much of the pottery was used for feasts and other entertainments; the goblets (*greciales*) had to fit the grasp of the hand and be inviting to drink from; the great dishes (*platos*) had to be suitable for carrying food, and yet should also look magnificent when displayed on the sideboards (Plate 61). The wide basins (*braseros*) had to hold water without spilling over the guests—hence the straight side and broad rim. The pitchers (Plate 60) were for watering the hands of the banqueters between courses; the great covered tureens (Plate 59) had to be portable

60 Tall jug, about 42 cm high; blue and reddish-amber lustre on tin-glaze. The Moorish *alafia* design, signifying good fortune, appears in blue on the middle of the neck. The shape came originally from metal vessels. Jugs of this kind were used, but the form is as much dramatic as functional. Manises, or possibly Málaga, about 1400. Musée National de Céramique, Sévres. See page 105



61 Dish, 46 cm wide; blue and orange-gold lustre on tin-glaze, and inscribed in blue 'equi noia maria'. In the centre the arms of Castile and of Buyl, the Lords of Manises. Manises, about 1450-60. By courtesy of the Victoria and Albert Museum, Salting Bequest. See page 105



Fig. 8. Three variations on the tree of life design: Spanish lustre, early 15th century. The design was usually freely drawn, seldom symmetrical, and a vast number of varieties came into being. See page 109.

62. Large *albarello*, about 40 cm high: deep-blue and red-gold lustre. Grand and decorative, the designs are also emblems of divine providence and human well-being, and include the tree of life and the pinecone of abundance. Is the alternation of rising and descending emblems simply a neat interplay of designs? It could also be a deliberate symbol. Manises, about 1425. Musée du Louvre, Paris. See page 109.

but must also keep the soups and sauces hot; planters and flower-holders had to be elegant but also stable, and the jars (*albarellos*) had to stand firm on a table or shelf but also be easy to pick up (Plate 62).

A remarkable fifteenth-century picture attributed to Apollonio di Giovanni represents *Dido's Feast for Aeneas*, but the setting is entirely Spanish, and the pottery is a Manises service similar to that ordered by Doña Maria (Plate 69).

The lustre ware never became merely showy, as happened later elsewhere. Even the most famous armorial pieces, usually displayed on walls or sideboards, as seen in the painting, were used when the occasion was important enough. Behind the courtly decoration lay the ancestry of the form itself, evolved and modified by generations of working hands as they

dealt with the necessities of life common to both nobleman and labourer. Most of the forms of Hispano-Moresque lustre have equivalents amongst the simple glazed or unglazed vessels in daily use in every town in the land.

Not all Manises lustre was for palaces. Some was acquired by merchants and townspeople and was recorded in their inventories and legacies;¹¹ some was made for the apothecary's trade; much was made for religious communities and for churches and was painted with religious themes such as the sacred monogram, invocations to the Virgin, or with an emblem such as the Lamb and Flag, symbol of the Resurrection and Redemption.

Considerable amounts of lustre were exported to Italy, France and the Low Countries, and the overseas trade reached its greatest extent in the mid-fifteenth century. Remarkably, the largest find of Hispano-Moresque lustre ware, apart from Manises itself, was excavated at Sluis in Flanders.¹²

Lustre tiles were also made, for walls, floors and ceilings; the most popular shapes were squares, rectangles, long hexagons, and triangles.¹³ An extensive arrangement of tiles, mostly of strongly Moorish character, but mixed with Christian symbols and inscriptions, decorates the interior of the cupola of the Convent of the Conception in Toledo. This series of over four hundred specially shaped tiles is virtually an encyclopaedia of traditional Nasrid lustre designs¹⁴ though the tiles were almost certainly made by Moorish craftsmen at Manises. Other tiles were made for religious monuments and wayside crosses and for pavements (Plate 64). A number of contemporary paintings include representations of the lustre-painted flower-vases that were often placed on altars and in shrines, and make it possible to establish dates for some of the decoration.¹⁵

Grand or modest, the tiles and pottery were a background to daily life: their reflecting brilliance and their designs had a vitality for which the word 'decorative' is inadequate. Beyond their appeal to the eye, the images and symbols engage both the thoughtful and the dreaming parts of the mind, and their shifting reflections, dull at one moment and then suddenly lit up, are to some extent mirrors of the human mind itself. Whether or not lustre was placed in a religious setting, its spiritual associations were never far distant, and it was natural that it should be used to honour the heavenly hierarchies.¹⁶

Many motifs of Islamic origin reappear in various forms in Manises lustre of the first half of the fifteenth century, in particular the six-pointed star, the gazelle, the Hand of Fatima, the *alafia* pattern, interlace of various kinds, palmettes, the cockspur, the *ataurique*, arabesque, and leaf scroll, and various versions of the tree of life (Figure 8), which, inverted, also resembles the hanging lamp, the symbol of divine Grace (Plate 62).¹⁷

¹¹ See Frothingham, *op. cit.*, p. 74 et seq.

¹² J. G. Hurst and D. S. Neal, 'Late Mediaeval Iberian Pottery imported into the Low Countries', *Rotterdam Papers*, IV, 1982, pp. 83-110. Almost all the lustre sherds belong to the period 1425-75.

¹³ See Martí, *op. cit.*, vol. II, 'Alicatados y Azulejos' for a copious record of designs.

¹⁴ Martí, *op. cit.*, vol. II, 'Alicatados y Azulejos', Pl. 217 and figs. 179-246.

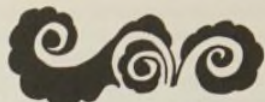
¹⁵ Martí, *op. cit.*, vol. III, 'Azulejos, Retablos y Socarrats', p. 539 et seq., and Martínez Caviro, *op. cit.*, figs. 124-8.

¹⁶ The religious symbolism is discussed later on pages 192-3.

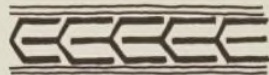
¹⁷ e.g. Martí, *op. cit.*, vol. I, figs. 473-4.



A Alafia pattern



C Atauriques



B Cockspur design



D Design of crown, flowers, and leaves, about 1460

Fig. 9

The general mood of Manises lustre does not depend only on its themes but on the verve with which they were presented. Like recitalists in a concert, the painters often placed contrasting themes from their repertoire side by side to set one another off. Broad interlacing brush-strokes of blue building up a tree of life design were often combined with a delicate background of lustre arabesques in fine lines punctuated by dots and stops. The fleshy letter-forms of a band of *alafia* pattern were often contrasted with a crisp design of chevrons or interlace. Most of the large vessels follow a convention so frequent that it amounts almost to a design principle: the composition can be 'read' on three distinct scales (Plate 63). The main features were often painted in blue, because it was applied first, under the glaze;

63. Plate, about 34 cm wide: blue and golden-amber lustre on tin-glaze. The deep blue was painted under the glaze and penetrated it in the firing. The fine lustre designs were painted later on the fired glaze, and change the scale. The curiously disorientated central star softens the effect and would have been unthinkable in Italy. Manises, first quarter of 15th century. Instituto de Valencia de Don Juan, Madrid.



64. A unit of five tiles for a pavement, 30 cm wide: golden lustre on tin-glaze, with the arms of Amboise and Albi. Manises, mid-15th century. Musée National de Céramique, Sèvres. See page 109.

within the main blue subdivisions came varieties of traditional emblems in lustre, such as the tree of life or the palmette; then, filling the contour-panels around the emblems, appeared various coils, punctuated scrolls, and fine arabesques making a vibrating continuum only visible at close quarters. The decoration was often very elaborate, but because of the distinction between the scales, the effect was seldom crowded. The density of the painting gave the impression that the vessel itself was glowing, not merely the brushwork. The two became one.

The Hispano-Moresque tradition is virtually symbolised in one particular type of lustre pottery, whose decoration centres upon a Christian coat of arms surrounded by Moorish ornament (Plate 65A, B). Many such pieces were made in the first half of the fifteenth century to commemorate important marriages, from which their dates can often be inferred. Most were fairly large pieces, wide basins and dishes, platters, vases and *albarellos*. They played a similar part in European culture to the lustre in wealthy households in the Middle East. Their golden colour suggested wealth, prosperity and good fortune (the very words which were so often inscribed on comparable Islamic vessels), but this association arose from their glow and brilliance rather than from any resemblance to golden vessels. Few of the designs had any equivalent in precious metal and they often included areas of blue, which immediately showed them to be earthenware.

Nonetheless, their popularity amongst people of high standing in the fifteenth century



65A. B. Large dish, about 45 cm wide: silvery-golden lustre on tin-glaze with the arms of Aragon and Navarre, surrounded by detailed patterns from traditional Moorish designs. Manises about 1425. Musée National de Céramique, Sévres. See pages 101 and 111



Back of the same dish, with light-hearted brushwork in lustre.

was probably partly due to the shortage of gold at that period.¹⁸ The association with precious metal was certainly in people's minds: lustre and blue were often described in writings as *dorado* and *argentato*, meaning 'gilded' and 'silvered', although the cobalt blue did not look in the least like silver.

Through these vessels the Moorish craftsmen poured into European palaces the graces of a tradition whose roots were as much metaphysical as aesthetic or social. The *obra de Málica* that now embellished European courts had once been shown in the palaces of the Nasrids not only as a display of grandeur but also, like the Alhambra vases, as an invocation. The signs and symbols meant little to the Christian owners beyond the rich effect of the 'saracen' ornament. Had they been understood, the pottery and tiles in religious buildings might never have been used, for they are filled with Muslim religious symbols.

The subservient position of the Moorish craftsmen of Manises is implied unintentionally by the compositions of these vessels, whose Islamic ornament forms a background to dignify Christian emblems and heraldry. Ironically, some eminent persons are only remembered through the lustred pottery they commissioned and by the wealth of skill lavished in their honour by craftsmen who were grateful to serve the high and the mighty. It is remarkable that not a single signed piece of Hispano-Moresque lustre has been recorded from the whole of the golden age of its manufacture.

By the middle of the fifteenth century Moorish designs were being gradually replaced by European motifs. The effect became more decorative and more secular. Some of the grandest of all Hispano-Moresque lustre belongs to the period 1440 to 1480 (Plate 66). It



66. Plate, about 35 cm wide: blue with reddish-gold lustre and a coat of arms with the sacred monogram incised in the cartouche. The popular decoration of crowns and leaf-and-flower ornament is an intriguing mixture of static emblems and movement. Manises, about 1460. Instituto de Valencia de Don Juan, Madrid.

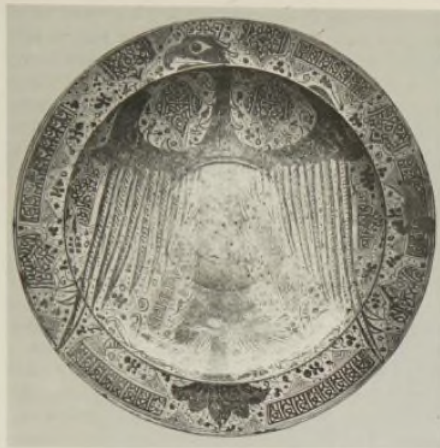
¹⁸ See page 128.

drew upon a rich repertoire of ornament including varieties of rosettes, the 'sliced orange' flower, the elegant and endlessly adaptable leaf-and-scroll motif, Christian and court emblems such as the fleur-de-lis, and the lovely bryony pattern with its intertwined stems and alternating leaves of lustre and blue, the most popular of all the Hispano-Moresque designs, which became internationally known as the hallmark of this type of ware and appears often on the pottery shown in religious paintings.¹⁹ The finest of the eagles painted on the backs of large dishes belongs to this period; the design was originally suggested by heraldry, and the painters made it into a grand emblem in its own right (Plate 68). They did the same with the lion of Leon (Plate 67), the bull (from the Buyl arms) (Plate 73),

¹⁹ Charleston, *World Ceramics*, fig. 398 (detail from the Portinari Altarpiece by Hugo van der Goes. The author adds that the design came into use as early as 1427).



67. Back of a large dish, about 42 cm wide: golden-orange lustre on dense tin-glaze. The inside has the arms of Leon, Castile and Aragon. The heraldic lion of Leon has become a vigorous, near-abstract emblem, encompassing the whole form but also brilliantly subdividing it into panels full of movement. Manises, about 1450. By courtesy of the Victoria and Albert Museum.



68. Large platter, about 45 cm wide: reddish-amber lustre on tin-glaze. Manises, first quarter of 15th century. Instituto de Valencia de Don Juan, Madrid. See page 114.

the castle of Castile, and the Lamb and the Gazelle from Christian and Islamic religious symbolism.

The lustre ware of this period was often of very high quality: the designs and the painting were ingenious and fluent, and they were given all the time and care they needed. A high proportion of important pieces was made to commission. Up to about 1480 the level of design and technique remained consistent and the craftsmen remained constantly adaptable. It is rare to find exactly the same design on any two vessels; the elements of a composition recur again and again but in different combinations, resulting from an intuitive memory rather than reliance on any set formula.

It is a mystery how the Moorish craftsmen managed for so long to maintain high technical standards and a large production, and at the same time such freshness of design and execution, which extended even to the smallest details of the brushwork. Continuity and inspiration have always been difficult to balance, in the arts and in industry. Perhaps the explanation of their achievement is partly that the Moorish craftsmen remained throughout most of the fifteenth century a distinct group within an alien culture: the closed circle conserved their energies and their traditions preserved their dignity.

By the end of the fifteenth century the quality had begun to waver, partly because of the success of the earlier work and the consequent increase in demand. The change is seen

in the growing number of repetitive small-scale designs requiring dutiful attention rather than a strong idea. When these were first made, about 1480, the small-scale patterns were subtly differentiated and were well painted. Often they were used to make a scintillating background to a coat of arms, and have freely drawn animals or birds on the back (Plates 72–3). By about 1500, however, the coat of arms was often replaced by a crudely drawn animal; the backs of the dishes were minimally painted, and the miniature patterns became stereotyped. The work no longer communicated the former life-enhancing force. It was becoming simply a background to a certain style of life and neither the makers nor the owners were any longer astonished by it.

Long before any lustre was known around Valencia, the neighbouring town of Paterna had produced a vast range of pottery, the best of which was painted in copper-green and manganese or iron-brown on an off-white glaze. There was an enormous variety of brush-painted designs of mixed Spanish and Islamic origin, many of which incorporated strange human and animal figures.²⁰ When pottery painted in lustre and blue began to be made at Manises, some effort seems to have been made to guard the secrets of its manufacture from those who made the common Paterna wares. This may have been the purpose of the contract quoted above on page 101. If so, the intention was bound to be vain. Paterna already housed many Muslims naturally sympathetic to their neighbours in Manises, and technical knowledge could not be kept secret when the adjacent town was already a nest of potteries. Even by the second quarter of the fifteenth century, documents mention lustre manufacture in the neighbouring towns of Paterna, Alacuás, Cuart and Mislata.²¹ Although Manises held the leading place, Nicolas von Popplau's record of 1484 makes clear that Paterna was also known for lustre, and that the skill was associated with the Moorish population rather than with any single area. In his monumental work on the lustre of Eastern Spain, Martí attempted to distinguish between the lustre of Paterna and Manises, but there does not appear to be enough archaeological evidence to separate the two at all clearly.²²

Of the pieces attributed to Paterna, the most frequent is a small bowl painted simply with radial or banded designs around a central motif. A few pitchers and jars have also been recorded. Though these designs include Moorish features, they were not the same as those of Manises. They were adaptations of designs already known in the common green and brown Paterna pottery, and they had the quick, intuitive inventiveness typical of Paterna, a physical response rather than a mental plan.

The 'treasure' of the village of Pula in Sardinia consists of a number of bowls and three small jars with the same characteristics. The bowls are believed to have been provided by local families for the sacrament of Extreme Unction. Tradition required that they should not later be put to everyday use, so they were thrown away, and discovered centuries later on a rubbish-tip. The bowls are all about 15 centimetres wide and each one is differently decorated. They were painted first with a simple but ingenious structural design in blue;

²⁰ Martí, *op. cit.*, vol. I, pp. 103–213, with numerous illustrations.

²¹ Frothingham, *Lustreware of Spain*, p. 82.

²² Martí, *op. cit.*, pp. 330–62.



Fig. 10. Four bowls painted in lustre and blue, probably from Paterna, found at Pula, Sardinia. Museo di Cagliari

within the divisions were added lustre designs suggesting trees, ferns, flowers, and palmettes, and chevrons, chequers, stars, and letter forms (Figure 10).²³ They are orderly and unpretentious, always slightly unexpected, and joyful as a summer morning. In their way they are just as important an expression of the Hispano-Moresque lustre tradition as the great armorial platters. The origin of these delightful bowls has never become clear. They have been reasonably attributed by turns to Manises, Paterna, and Málaga. On balance, they seem most likely to have been made in Paterna, probably in the first half of the fifteenth century. Two similar bowls have been excavated in Paterna itself.²⁴

Apart from the symbolic gazelle and peacock, animal designs had been rare in Nasrid

²³ The bowls are now in the Museum of Cagliari, Sardinia. Twenty-four of them are illustrated, mostly in colour, by Martí, *op. cit.*, vol. I, amongst figs. 416–44, and are discussed on p. 333 et seq.

²⁴ *Ibid.*, figs. 423 and 455.



69. *Dido's Feast*, left half of a panel painting attributed to Apollonio di Giovanni, 15th century, representing the feast in a contemporary setting. The pottery, recognisable as Manises lustre ware by its painted designs, is both for use and for display. Niedersächsisches Landesmuseum, Hanover. See page 108



70. Small bowl, 19 cm wide: blue on tin-glaze. The spaces may have been intended for lustre painting, which was never added. Paterna, 15th century. Instituto de Valencia de Don Juan, Madrid. See page 00



71. Small 'nun's bowl', about 15 cm wide: orange-gold lustre on semi-opaque tin-glaze. Manises, second half of 15th century. Museo Nacional, Valencia.

lustre. In the late fifteenth century and throughout the sixteenth, however, designs including animals and human figures became increasingly frequent in Hispano-Moresque lustre. Some of them first appeared as devices in armorial bearings; others derived from the popular figurative tradition of Paterna, such as huntsmen, hounds, hares, lions, wild boars, hawks, warriors, birds, griffins, pelicans, owls, dragons and various kinds of known and unnameable creatures, appearing not as decorative adjuncts but taking pride of place in the design. One of the most striking is the angel of the so-called 'nun's bowl', *escudilla de monja*, a simple, ingenious design, effective even when it was not well painted (Plate 71). All the varieties of angel have long skirts which come to a point at the waist, a tight bodice and outstretched wings. The profile head is defined by a halo of flat lustre; the straight combed hair, the eye, mouth and lips suggest considerable character, occasionally angelic, more often flirtatious or petulant. A great many 'nun's bowls' were made. They are an entertaining spectrum of dark and light emotions.

Early Manises lustre is usually yellow-amber gold. That of the mid-fifteenth century is usually orange-gold, which suggests that it contains about 25% of copper and was a little higher-fired. Throughout the century the glaze was a dense, satin-surfaced warm white, well opacified with tin, which then as now was a costly material. By the end of the century much of the lustre was red-gold, sometimes an iridescent crimson-red. This may have arisen from a change of fashion, but it also indicates a cheapening of the materials, for the red lustres could be made without any silver. By the end of the century the glazes became



72. Back of a large dish, about 36 cm wide: golden lustre on tin-glaze. Manises about 1480. Musée National de Céramique, Sévres. See pages 114 and 116

73. Back of a large dish, about 34 cm wide: golden lustre on warm tin-glaze. Manises, about 1480. Musée National de Céramique, Sévres. See pages 114 and 116



less opaque because of the smaller proportion of tin. Coinciding with a less adaptable approach to design and brushwork, these differences indicate a change in the pottery trade. They do not necessarily mean a less prosperous industry; the production might actually have increased, though for sale to a less discerning public.

By forming clay inside spinning moulds of bisque or plaster, shallow vessels could be produced consistently in large numbers with little or no need of trimming. This was a natural extension of throwing shapes on the wheel, and it could be performed by less skilled people. Until about 1460 moulds had been used most for wide dishes and platters, shapes which were difficult to make on the wheel. From then onwards they were used more and more often for platters and dishes with cusped, fluted or gadrooned sides and with bosses raised in the centre, forms resembling repoussé metalwork. By the late fifteenth century moulds were being used also for many kinds of smaller vessels which in earlier times would have been formed more carefully on the wheel.

Hispano-Moresque pottery was following a pattern of change which was to occur again and again in European ceramics; a technique is developed to a point at which it interests discerning patrons and commands high prices. The work is then desired by a larger number of people whose style of living reflects that of the wealthy, but who are unable to spend so much. Production increases to meet this demand, but the quality and inventiveness decline, and various standard wares become established. As more people are employed, the general level of skill declines, and a larger number of cheaper vessels are sold. Eventually the wares become common and unprofitable. The industry contracts, but once regular production has ended, the surviving examples awaken romantic associations and people begin to collect them. Their value rises; some forgeries are made, and the industry may even be revived, though on a smaller scale.

Though Hispano-Moresque lustre was entering the second phase of this sequence by the early sixteenth century, there was still a long course ahead of it, and some different and beautiful lustre was yet to be made, but not all in the area round Valencia.

Once Valencia became celebrated for lustre, some of the masters migrated to other regions. Wherever traders had already introduced lustre ware, a potential market awaited the travelling artisan. There were also other pressures: the semi-feudal ties between the landlords and their vassals limited the craftsmen's personal freedom. There are indications that the Moorish craftsmen were segregated and lived under a social stigma.

A contract of 1461 records a Manises lustre-master who transferred his work to Barcelona.²⁵ During the sixteenth century lustre began to be made at several other cities

²⁵ 'Both parties, by coincidence—for there was no relationship—were called Pedro Eximeno, and they formed a partnership to make lustre in Barcelona for the following twelve months. Pedro of Mislata was to be present in person, together with his son and a nephew, Jaime Roig. The other party promised, in addition to his own attendance, the work of one prisoner or slave, and of one peasant; he was to provide a house in Barcelona with tools and equipment and all the necessary raw material, and he undertook that Eximenes of Mislata should not be charged any rent. . . . The profit realised by sales was to be equally divided.' (From Martí, op. cit., p. 231 ff., quoting G. J. de Osmá, *Los Maestros alfareros de Manises, Paterna, y Valencia*, Madrid 1908, p. 57.)

74 (below). Spouted jug, about 14 cm high: golden-red lustre on tin-glaze. A domestic vessel with an insignificant decoration suitable for semi-skilled repetition. Valencia, 16th century. See page 121



75 (right). Two-handed pot on a pedestal foot, 22 cm high: very strong red-gold lustre on yellowish tin-glaze. Though pots such as these were popular for display in private houses and churches, the exaggerated Islamic form and the bird decoration cannot compare with earlier Manises tradition. Probably from Valencia, second half of 17th century. Instituto de Valencia de Don Juan, Madrid. See page 125



to which it had already been taken by traders. In a sense they were colonies of the older-established workshops of Manises and Paterna which, by the end of the fifteenth century, had already spilled over into neighbouring towns, Mislata, Alacúas, Aldaya, Carceres.

Tarragona and Reus also began to make lustre during the sixteenth century. Though they are only about eighty kilometres from Barcelona, the character of the work suggests that it was started direct from Valencia. Attractive though it could be, it added little to the Valencian tradition. The most frequent Reus design is a quaint long-tailed bird, a design that could virtually be painted in a numbered sequence, and looks to modern eyes not unlike a child's construction kit. It appears on Reus vessels of all kinds in the sixteenth and seventeenth centuries (Plate 76).

Lustre was also made far inland up the valley of the Ebro at Muel and Calatayud, beyond Zaragoza. Though these towns lie far from Valencia, there was a natural connection by sea and up the Ebro valley, a route well known to traders. Excavations have shown that the earliest Muel lustre belongs to the beginning of the sixteenth century.²⁶

Moulded *cuenca* tiles with lusted surfaces were produced at Seville from the end of

²⁶ M. Almagro Basch and L. M. Llobiá Munné, *Cerámica: Aragón-Muel*, Barcelona 1952, pp. 16-17.



76. Large bowl, about 48 cm wide: red-gold lustre on yellowish tin-glaze, representing a remarkable flying bird which is seen more intelligibly in Plate 75. Valencia or Reus about 1700. Musée National de Céramique, Sèvres. See page 122

the fifteenth century. The idea and the technique were different from the tradition of painted lustre, which did not lend itself well to application on relief surfaces. The tiles appear to have been flooded with lustre pigment, in much the same way as a glaze might be applied, and the Seville technique is therefore related to the long established method known as *cuerda seca*, in which clay was covered by glazes of different colours, without any brushwork.²⁷

Barcelona was much the most important of the new lustre-making centres. It had for centuries been an important port in the northbound sea-trade from Valencia and Málaga. During the sixteenth century a great deal of lustre was made in workshops in and around the city, which are today grouped under the name Catalanian. Most of the lustre is a bright, warm silvery-gold, and strongly iridescent. The pottery was probably fired at a slightly lower temperature than the Valencian wares of the same period, and the sheen suggests that the pigment was richer in fluxes such as sea-salt or potash (Colour Plate XX).

Technical changes often occur when craftsmen move to new places and have to re-establish a known method with somewhat different raw materials. The Catalanian lustres are sufficiently distinct to suggest that the change was intentional. Their silvery *argentado* finish was perhaps a reaction away from the golden and red *dorado* of Valencia. The designs and brushwork were bolder and more cursive than the balanced designs of Valencia. They have a new vitality of touch, and the lasting popularity of freely-drawn animal, birds, fishes,

²⁷ Martínez Caviro, *op. cit.*, pp. 239-50, and plates.



77. Small bowl, about 16 cm wide: golden lustre on tin-glaze. Sun-faces are ever popular but they are specially associated with lustre and occur again and again wherever it was made. Possibly Catalonia, 17th century. Musée National de Céramique, Sévres.

and human figures is a reminder that the Catalans were in some ways closer to the Italians than to the Spaniards.²⁸

A remarkable notebook survives from the workshop of one Nicolau Reyner, a Catalan master-potter of Barcelona, recording the purchases of material, kiln-rents, and the sale and export of pottery during the years 1514–19. Reyner had only three regular assistants, and a boy who minded the kiln, but appears to have engaged other people and hired extra kiln space when he had large orders. His *Libre de Fornades* is a unique early record of a small workshop and provides an all-round picture of a master-craftsman's life and responsibilities.²⁹ Much of Reyner's output went by ship to Italy.

The lustres of Zaragoza, Muel and Calatayud were probably made by craftsmen coming direct from Valencia, not from Barcelona, for they were mostly made in golden or red pigments, and the designs and brushwork were provincial versions of Valencian styles. Amongst the most attractive products were small bowls with two moulded handles; on this scale the rapid brushwork showed at its best. The work continued from the early sixteenth to the eighteenth century. Henry Cock's short description of the pigments and painting in 1585 is quoted on page 215.

After the reconquest of 1492 the Muslims became an alien minority in Spain. Christians and Muslims had lived side by side for centuries and grown accustomed to one another.

²⁸ See Martínez Caviro, op. cit., figs. 208–17 and pp. 227–36.

²⁹ For a detailed summary see Aimad de Lasarte, 'La Loza dorada y alfarería barcelonesa, siglos XV–XVI' in *Anales y Boletín de los museos de arte de Barcelona*, 1942, vols. 1–2, pp. 89–104.

The Mozarab and Mudejar elements in the community (Spaniards adopting Moorish life and Muslims living in Christian environment), reflected the coexistence of the two groups. During the sixteenth century, however, the Church became increasingly intolerant, and the secular authority passed a succession of edicts against Muslim customs and worship. The personal position of Moorish people became increasingly uncertain. Some appear to have been converted to Christianity; some went to Catalonia and Navarre, where a small amount of lustre was also made,³⁰ kingdoms far enough from the old Moorish centres to remain relatively free; others went to North Africa, to which they were connected by ties of blood and of religion.

Eventually in 1609 the entire Muslim population was banished, and most were shipped to North Africa where they eventually merged with their kinsfolk in the Almohade kingdom. The event was a double loss to the arts and industries of Spain for there was little scope for the craftsmen in their new home, and in Spain itself their departure was an irreparable loss to building, carving, ironwork, leather and, not least, to pottery.

The art of lustre was in decline in Manises, in any case,³¹ but the expulsion of the Moorish craftsmen is reflected in the immediate decline of the forms of vessels, the painted designs and the quality of the lustre itself. The opaque glazes were cheapened throughout the seventeenth century by cutting down the tin content, until they became yellowish and eventually almost clear, and the pigments contained less and less silver, so that the lustre of the seventeenth and eighteenth centuries is usually red or brassy orange-gold. The lovely iridescence of the Islamic heritage was replaced by a relatively strident metallic sheen.

A few exceptional pieces were still made. The 'hidden cross' design is one example (Colour Plate XXI). This design was much repeated on dishes in the first half of the seventeenth century and it retained the interplay of positive and negative pattern which is a part of the Islamic legacy. One of the most popular of the designs of the late seventeenth and early eighteenth centuries was based on carnation flowers springing from a small vase and spreading lavishly across the interior of bowls and dishes. It was an attractive standard design.

A remarkable and fairly uncommon type of later lustre was a bright golden-red fired on to a deep blue glaze over an off-white clay. The lustre designs were mostly repetitions of small-scale patterns, extremely striking when the lustre catches the light (Plate 78 and Colour Plate XXXH). The blue glaze only worked well over a clay lighter than that normally used at Valencia, and this pottery probably came from a specialised workshop. The Valencian blue-glaze lustres probably belong to the first half of the seventeenth century. They are a rare instance of the Spanish use of coloured grounds, which were much more often used in the Middle East.³²

³⁰ Frothingham, op. cit., p. 271.

³¹ Frothingham, op. cit., p. 208 ff. Possibly because, with the influx of precious metal from America, wealthy patrons were once more able to obtain vessels of gold or silver-gilt.

³² The Victoria and Albert Museum, London, and the Musée National de la Céramique, Sévres, both have several fine examples.



78. Large lidded pot with handles. 26 cm high: bright golden-red lustre on transparent blue glaze over off-white earthenware. Lustre was less often painted on coloured grounds in Spain than in the Near East, and vessels such as this may have been suggested by earlier Syrian lustre. Valencia, probably early 17th century. Musée National de Céramique, Sèvres. See page 125



79. Large bowl. 38 cm wide by 16.8 cm deep: golden-copper lustre on tin-glaze. The technique belongs to Valencian tradition, but the whole decorative idea is alien to it. The painter seems to have tried to follow a floral style belonging to fashionable faience, without understanding it. Probably Valencia, second half of 18th century. By courtesy of the Victoria and Albert Museum.

By the late eighteenth century the Spanish lustre industry was in decline. The report on the techniques of Manises lustre, made for the mayor of Valencia in 1785 (see page 216) was compiled in an attempt to record an industry which looked as if it were about to disappear. It almost did so in the hard conditions of the Napoleonic Wars. Its survival into modern times is described in a later chapter.

LUSTRE IN ITALY: DERUTA AND GUBBIO

Lustre ware had been imported into Italy for three hundred years before any was actually made there, but only a few examples of the early sporadic imports now survive. The most important are the dishes that were until recently mortared into recesses in the exterior walls of churches in Pisa as a decorative feature of the architecture, as we have seen.¹ Preserved for centuries by being far beyond reach, these dishes, known as *bacini*, are now the most extensive of all datable sequences of lustre ware: the Egyptian Fatimid dishes set into the walls of San Sisto about 1180, the Andalusian examples of the early thirteenth century in Santa Cecilia, and early fifteenth-century Valencian *bacini* in the walls of the former convent of Sant'Anna.²

The original Italian name for lustre, *maiolica*, acknowledges the connection with Spain. Confusingly, the name was later applied to tin-glaze pottery in general, but in the fifteenth and sixteenth centuries it signified lustre exclusively, while tin-glaze wares were known as *bianchi* (white ware).

Piccolpasso, who wrote the first major description of pottery-manufacture in Europe, consistently referred to lustre as *maiolica* in the *Three Books of the Potter's Art*, completed in 1558.³ The term has the same meaning on a large dish painted by Nicola Pellipario in Urbino; touches of lustre were fired on at Gubbio, and it was inscribed on the back '1532 M.G. finì de maiolica' ('finished in maiolica by M.G.').⁴

Some Italian writers of the time considered that the word *maiolica* came from the island of Mallorca and believed that lustre ware was originally imported from there,⁵ an idea which has little historical basis. It is more likely that the usual Spanish name for lustre, *obra de málaga*, was Italianised to *maiolica*.

The first recorded Italian instructions for making *maiolica* lustre ware were written by

¹ In the course of the 1970s they were replaced by facsimiles and the originals were transferred to the Museo Nazionale, Pisa.

² Berti and Tongiorgi, *op. cit.*, pp. 259-61, 268-9, and 270-1.

³ *The Three Books of the Potter's Art*, translated and introduced by Ronald Lightbown and Alan Caiger-Smith, London 1980, vol. II, pp. 86 and 91.

⁴ A. M. Marabotti in *Maioliche umbre decorate a lustro*, Florence 1982, p. 49. The dish is now in the Museo Archeologico, Bologna.

⁵ e.g. by Leandro Alberti in about 1530. See *Maioliche umbre*, as above, p. 60.

Benedetto Ubriarchi in the first half of the fifteenth century (see page 211). Ubriarchi did not fully understand the method and his directions could not have worked, but the fact that he wrote them down at all is an indication of Italian interest not simply as buyers of lustre but as would-be manufacturers.

This interest was quite explicable. Their own native tradition of painted tin-glaze pottery was developing rapidly, extending its range of colours and finding new markets where figurative designs and emblems were appreciated, pieces valued for display as works of art rather than for traditional uses. It was a challenging and profitable time for potters, who had hitherto been regarded as one of the humbler kinds of craftsmen. They were now delighted to find their works being favourably compared with those of goldsmiths.

Before the amazing flowering of the potteries of Florence and Faenza in the second half of the fifteenth century, a great deal of luxury pottery was imported from Valencia, for Italian workshops produced nothing comparable to the Spanish designs in lustre and blue.

Lustre ware was of special interest in the Italian market because the shortage of gold at that period made gold vessels excessively costly.⁶ Lustred vessels from Valencia, many of which had armorial decoration, were an acceptable and reasonably-priced alternative. Their white ground and the addition of blue to the design meant that they were not simply imitations of metal vessels: they were admired in their own right, but the lustre afforded the gleam and opulence that few things other than the precious metals could provide.

By about 1450 the potters of Florence and Faenza had acquired *zaffre* (cobalt ore) to add blue to their palette, and began to produce their own versions of Hispano-Moresque designs, such as the famous bryony pattern, knot designs and mock-Arabic lettering, arabesques and *atauriques*. But they could not make lustre, and the lustre of the Spanish originals was often suggested in manganese-purple or antimony-orange instead.⁷

By the 1480s, however, they were developing their designs and figure-drawings quite differently from anything known in Spain, and working in ways that were eventually to make lustre less important to them. Through expressive line-drawing and subtle tones of colour Italian tin-glaze painters now achieved an ingenious and sensitive decoration perfectly married to the vessel forms, which at this period were complemented, not overburdened, by the decoration. Within a decade they were already feeling their way towards the relatively pompous *istoriato* pictorial convention of the High Renaissance.

In view of the self-evident technical skills of the foremost Italian workshops and the extensive trading connections between Italy and Spain, it is hard to believe that master-potters could not have discovered the secrets of lustre either by experiment or by commercial espionage.

⁶ *Cambridge Economic History of Europe*, vol. III, p. 333, and Denys Hay, *Europe in the 14th and 15th Centuries*, London 1966, p. 372. It was not that gold was scarce, but that the need of gold for coinage and trade strained the supply. Silver was also in demand, though less seriously. With the arrival of gold and silver from the New World around 1500 the situation changed completely.

⁷ For examples, see Rackham, *Catalogue of Italian Maiolica*, nos. 50-2 and 67-9; and Cora, *Storia della Maiolica di Firenze*, Florence 1973, vol. I, pp. 129-38 and vol. II, pls. 130-3, 142, 145-6 and 181-3.

XXIV. Small *maiolica* dish assembled from more than one original, about 15 cm wide. A popular type of dish made for pilgrims to Assisi and local devotees of St Francis. The sun-disk and sunflower-tree motifs were standard Deruta designs, specially appropriate for the lustre in which this small town excelled. About 1530. Museo Comunale, Deruta. See page 140



XXV. Large two-handled *maiolica* vase and cover, 39 cm high overall. As with much Italian *maiolica*, the form descends from traditional, functional pottery but has become a show-piece only used for important occasions. Deruta, about 1515. By courtesy of the Victoria and Albert Museum, Salting Bequest. See page 135



XXVI. *Maiolica* plate, 31 cm wide: with the arms of Francesco Maria della Rovere, Duke of Urbino, inscribed 'AMOR', 'pena i dios' and 'uiuerai felice', and dated 1522. Perhaps because of the plate's importance the lustre pigment has been flooded unusually thickly over the reserved areas within the blue design, masking some of the detail, but it is a fine example of the *maiolica da pompa* which made Maestro Giorgio's fame and fortune. By courtesy of the Victoria and Albert Museum. See page 148

XXVII. Oval earthenware dish, 56.5 by 43.5 cm. 'Dante and The Death of Beatrice', from Rossetti's painting of 1871, now in the Walker Art Gallery, Liverpool, by Alfredo Santarelli of Deruta, about 1920. Typical of many of the dutiful works of the Italian revivalists who followed the craftsman's traditional role of imitator, although elsewhere the craftsman's creative potential was more highly regarded. Museo Comunale, Deruta. See page 166



XXVIII. Dish, about 35 cm wide: brilliant red-gold and dilute pink lustre on tin-glaze earthenware. A deliberate extravaganza based on the old Gubbio grotesques. The owl at the top is a caricature of De Morgan's friend, the painter Burne-Jones; the technique and the humour are both typical of De Morgan. About 1880. De Morgan Foundation Collection, Cardiff Castle. See page 169



XXIX. Punchbowl, 36 cm wide by 19 cm deep: golden and silvery reduced-pigment lustres on deep-blue glaze over white earthenware. The dark glaze appears to have been acid-etched to become light blue in certain areas before the lustres were applied. The technique may have been suggested to De Morgan by the bleached-indigo designs on textiles by his friend William Morris. The bowl is an industrial shape from Staffordshire, bought-in by De Morgan for decorating. Painter's mark F.P. (Fred Passenger). About 1899. De Morgan Foundation Collection, Cardiff Castle. See page 169



XXX a. Detail of a large bowl, showing the iridescence of silver-copper lustre. Kashan, early 13th century. Ashmolean Museum, Oxford. (Photograph, Alan Peacock). See page 65



XXX c. Detail of a pot similar to Colour Plate XXXI. Alan Peacock, Canberra, 1983. See page 180



XXX e. Detail of a bowl; iridescence produced by varying thicknesses of reduced silver-copper pigment on barium-matt tin-glaze. Edgar Campden at Aldermaston Pottery, 1982. See page 178



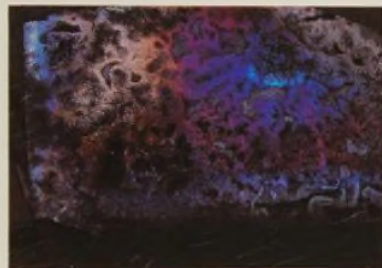
XXX f. Detail of interior of a dish; reduced silver-copper lustrs on grey-blue glaze. Said Es-Sadr, Cairo, about 1981. See page 180



XXX b. Maiolica plate, about 25 cm wide; a winged figure of Love in the centre, typical of Gubbio, as is the rich blue and golden and ruby lustre. This piece was fired unevenly, so the ruby colour varies from deep red to soft pink, and on the hotter side the lead-tin-glaze has been reduced to grey. 1525-30. By courtesy of the Victoria and Albert Museum. See page 148



XXX d. Detail of a bowl; reduced-pigment lustre from chlorides of silver and copper, showing migration of copper vapour to the surrounding glaze. Alan Caiger-Smith, 1982. See page 179

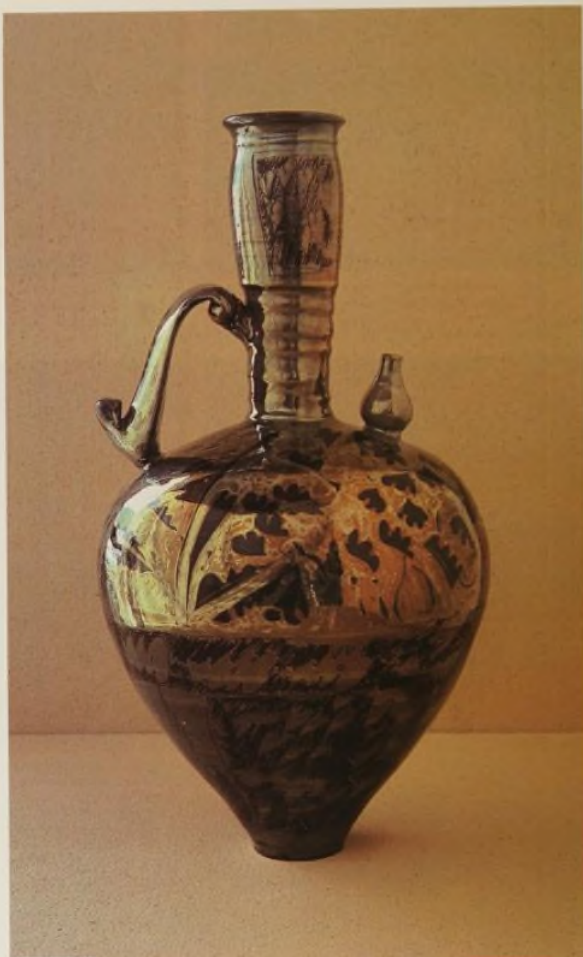


XXX g. Iridescent glaze after reduction with a gas-torch while still hot from the kiln. Graham Oldroyd, Sydney. See page 181



XXX h. Small dish about 20 cm wide; iridescent lustre on transparent cobalt blue glaze over off-white clay. Valencia about 1600. Musée National de Céramique, Sèvres. See page 125

XXXI. Large pot, 57 cm high: silver, copper and mercury reduced-pigment lustres on black-glazed earthenware. A vessel inspired by traditional Islamic forms but subtly altered into sculptural instead of functional significance. The changing lustre colours arise from carefully varied thicknesses of pigment, rubbed and incised when dry. Alan Peacock, Canberra, 1983. Museo Hispano-Musulman, Palacio del Alhambra, Granada. See page 180



XXXII. Bowl, 40 cm wide: lead-borax glaze fired at 1140°C on grogged limestone marl clay. The reduced-pigment lustres, prepared from gold, silver and copper, were applied by brush and slip-trailer with wax-resist and sgraffito techniques, and reduced at 740°C. Sutton Taylor, 1982. Museo Hispano-Musulman, Palacio del Alhambra, Granada. See page 181



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XXXIII. Bowl, 21.5 cm wide and 8.5 cm deep:
amber-gold and iridescent silvery lustre on clear glaze
over grey slip on red earthenware. Alan Caiger-Smith,
1982. See page 194

The explanation is probably that by the 1480s the foremost potters had little wish to do so. They were already prosperous, and in particular they had learnt to indicate depth and modelling in their designs by painting in graded tones of colour. This became a virtuoso skill that fascinated them and their public, and it made lustre much less desirable to them. Lustre could even have held them back, because in lustre it is almost impossible to control colour-tone. It is essentially a two-dimensional surface effect; it is not easily combined with modelled drawing, and can easily contradict it.

This may explain why lustre was not made in any of the major pottery centres in Italy but only in three little-known places, although it had aroused admiration a few decades earlier. It may also explain why the first Italian lustre came to be made in a place such as Deruta, a small Umbrian town, whose pottery was hardly known further afield than the local markets of Perugia and Orvieto.

Like many other Italian towns, Deruta had produced simple pottery for local domestic use for several centuries. Tin-glaze wares (*bianchi*) were being made there by the 1470s,⁸ but no Deruta tin-glaze can be recognised as such until the 1490s, and even then it remained unsophisticated and had not embarked on the new convention of tonal modelling. However, by or before 1501, lustre was being made in Deruta. There are two early dated examples. The date 14 July 1501 appears on a small moulded relief panel of St Sebastian, painted in blue, yellow and pale-red lustre,⁹ and a spouted pharmacy jug with heraldic decoration painted in brown, black, soft-blue and golden-yellow lustre is dated 1502.¹⁰ From local excavations it appears that thirty to forty kilns were in use at Deruta early in the sixteenth century and that three or four of them were producing lustre.¹¹

Why Deruta? Deruta had much to gain by adopting a new technique and had not developed any clear line of its own to stand in the way, but many other towns were in a similar position. What special connections existed between a small town in the Umbrian hills and the Hispano-Moresque lustre-makers of Valencia across the sea? There is a good deal of circumstantial evidence which may account for this seemingly surprising connection. A clue is afforded by the many Hispano-Moresque features which occur in Deruta lustre.

Deruta, situated in the valley of the Tiber (Tevere), was the outpost of Perugia, one of the largest cities in the Papal States. Perugia was also a fortress guarding the mountain frontier. Deruta looked, therefore, towards Rome and the Vatican, and in the Vatican personal contacts could easily have been made with Spaniards from Valencia, attached to the retinue of Rodrigo Borgia (Borja). He had resided in Rome as a cardinal for many years before his election to the papacy in 1492 as the infamous Alexander VI (1492–1503). Rodrigo Borgia belonged to a noble Valencian family which patronised the Valencian potteries. The

⁸ See L. de Mauri, *Le Maioliche di Deruta*, Milano 1924, pp. 23–4 for documentary background; and especially Ugo Nicolini, 'La ceramica di Deruta: organizzazione economia maestri. I documenti', in *Antiche Maioliche di Deruta* (essays by various authors), Firenze 1980, pp. 21–43.

⁹ Victoria and Albert Museum (Rackham, pl. 37).

¹⁰ British Museum (*Maioliche umbre*, pl. 3, p. 93).

¹¹ Information provided by Dott. Giulio Busti of Istituto Statale d'Arte per la Ceramica, Deruta.



80. Large maiolica dish, 40 cm wide, tones of blue with iridescent golden-yellow lustre. A charming example of the *bella donna* dishes in which Deruta excelled, more sophisticated than the early version in Colour Plate XXIII. The lady's profile, head-dress and robe are reminiscent of the frescoes of Pintoricchio. About 1520. Museo Civico, Pesaro. See page 132



81. Self-portrait by Pintoricchio, a detail from the fresco in the Baglioni Chapel, Chiesa Santa Maria Maggiore, Spello, 1501. (Photograph reproduced by courtesy of Phaidon Press Ltd)

Borgia coat of arms features on many tiles and vessels made at Valencia for their palace at Gandia nearby. After his election to the papacy Alexander VI ordered considerable quantities of vessels and tiles from Valencia to furnish his apartments in the Vatican and also for the papal fortress, the Castel Sant'Angelo.¹² It is likely that the enormous numbers of tiles were delivered and set in position by craftsmen from Valencia, as had happened between 1446 and 1458 when Johan Murci of Valencia installed tiles in Naples in the new palace of Alfonso V, King of Aragon and Sicily.¹³

Amongst the Italians who would have had dealings with Spaniards in the Vatican was the painter Pintoricchio (1454-1513) (Plate 81), who was working between 1492 and 1494 on the frescoes of a suite of six rooms known as the Appartamento Borgia. Immediately afterwards he also painted frescoes (now no longer existing) in the Castel Sant'Angelo. All these rooms were paved with tiles ordered from Manises, painted in blue and lustre with designs incorporating the Borgia emblems and the Papal insignia.

Pintoricchio came from Perugia, and by 1495 he had returned to paint an altarpiece in his native city. He could not have failed to become acquainted with the craftsmen working on the pavements of the new apartments. The decoration was conceived as a harmonious entity, and the lustre of the tiles was balanced by areas of gilding within the frescoes on

¹² Marti, vol. I, pp. 530 and 644 et seq., and especially vol. II, pp. 621-44, with illustrations.

¹³ G. J. de Osma, *Las Divisas del Rey en los Pavimentos de obra de Manises del Castillo de Nápoles (años 1446-1458)*, Madrid 1909.

the walls. In his classic work on Valencian tiles, Marti considers that some of the tiles were actually designed by Pintoricchio himself, to echo the compositions of rectangles and medallions in the mural decoration.¹⁴

Pintoricchio's wife was the daughter of a potter in Deruta.¹⁵ In several locations the floors beneath his paintings are paved with Deruta tiles, and close derivations from his frescoes feature in many Deruta designs. Especially striking are the finely drawn profiles and head-dresses of young women in the celebrated *bella donna* betrothal plates (Plate 80).¹⁶ There is no doubt that the Deruta pottery painters were indebted to Pintoricchio for several of their designs, and their debt could well extend to the personal contacts which brought the lustre technique itself to their town.



82. Large maiolica dish, about 39 cm wide: blue drawing and iridescent yellow, golden lustre. The sun is shining on the rider and his hound and the lustre is not simply decorative. The tall trees, the palmette-form of the bushes and other details suggest some Spanish influence in this unusual early Deruta dish of about 1500. Musée du Louvre, Paris.

Assuming that the earliest dated examples known today were not the very first to be made, and allowing for some time spent unproductively on technical trials, the beginnings of Deruta lustre probably occurred by the mid-1490s, shortly after Pintoricchio's return to Perugia from Rome. The dated pieces of 1501 and 1502 show the lustre in an intermediate technical state: it is pale and not particularly lustrous. Within a few years a stronger colour and more iridescent lustre was being produced (Plate 82).

¹⁴ Marti, *op. cit.*, vol. II, p. 623 and p. 630 and fig. 890.

¹⁵ *Maioliche umbre*, p. 36.

¹⁶ *Maioliche umbre*, as above, pp. 28–31 and figs. 7–11.

Deruta pottery stands apart from all the rest of the Italian centres in that almost all its products retained a predominantly two-dimensional approach, with outline drawing, and a strong sense of the ceramic form as a vessel rather than as a vehicle for virtuoso painting. To contemporaries they may have seemed somewhat old-fashioned but actually the Deruta painters were doing something new and different; their restraint and their wariness of the fashionable artistic conventions of the day were almost unique.

The distinctiveness of Deruta cannot really be explained simply by its remote position. This could account for the tendency to conserve a familiar theme rather than break new ground, and certain old-fashioned habits, such as covering the backs of dishes with clear glaze rather than white,¹⁷ but it does not explain the lustre technique nor the strong, two-dimensional design impulse which accompanied it. These suggest that someone already familiar with Valencian lustre may have been present. Valencian prototypes, or drawings of current Valencian designs, may even have been brought to Deruta as starting-points for the new venture. The *vassoio* form, a tray-like dish with a central mount to support a pitcher (*versatorio*) was a form much produced at Valencia at this time, and was also a favourite at Deruta but was almost unknown elsewhere in Italy. Whatever the Spanish connections were, they met in Italy an artistic ambience very unlike that of Spain.

Italian craftsmen's workshops in general, and not only potteries, were in the midst of profound changes, and some account of them must be given in order to understand Italian ceramics of the Renaissance. Within the space of a single generation the dissemination of wood-cut prints and engravings had enabled applied-art designers in every field to have some knowledge of current works in architecture, sculpture and painting, and to derive designs from them. The impact was comparable with the development of television and photocopying in recent times, but it was even more influential in that it was highly selective.

Certain illustrated books from Northern Italy and Germany became rich sources of human and animal imagery and ornament for designers of every kind—for example, the edition of Ovid's *Metamorphoses* published at Venice in 1497, and Tuppò's *Aesop's Fables* published at Naples in 1485. The religious engravings of the painter, Martin Schongauer (1445–91), known in Italy as Bel Martino, circulated widely, and towards the end of his life Mantegna (d. 1506) engraved a number of subjects that were frequently used as sources by craftsmen. Some of them contained so many figures that dozens of different compositions could be derived from a single print. Prints and engravings provided craftsmen with subjects in an orderly two-dimensional form which could be conveniently studied, analysed and adapted, but they did much more. They transmitted themes which had hitherto been restricted to a single location, and had to a large extent been the preserve of persons of high social standing, to the whole of the professional, mercantile and artisan sections of Italian society. Through them, ordinary people in every provincial town could share in the cultural

¹⁷ A. N. Kube, *Italian Maiolica XV–XVIII Centuries in the State Hermitage Collections*, ed. O. E. Mikhailova and E. A. Lapkovskaya, Moscow 1976, p. 37.

property of privileged society. Craftsmen, therefore, did not only borrow subjects from prints and books for their own convenience: they helped to satisfy a general appetite for this cultural inheritance and its associations. The classical grotesques of ancient Rome, for example, were available through the prints of Nicoletto da Modena and (from the early 1520s) of Marcantonio Raimondi. They were copied by most kinds of craftsmen and designers because they were expressive and adaptable, but also because everyone associated them with an imagined world of grandeur and ancient glory.

The livelihood and routine of most pottery *botteghe* still depended on sustained output of standard goods as of old, but a new activity was introduced: the production of various kinds of prestige work, from vessels especially commissioned as display pieces (*vasi da pompa*), with specified emblems and images, to vessels made in small runs with variations on classical or religious themes derived from images on a printed page. Traditional motifs or popular local designs, however good, were not adequate for this kind of work. It had to convey something of the great world, the world of cities and palaces and the imagined glory of the past. The traditional artisan could not rise to this. New skills and different working conditions were needed. Thus a new category of pottery craftsmen came into existence, the designer-painter, working within the *bottega* but not part of its traditional structure; he depended on its facilities but worked on his own and made his own decisions. The change is evident from the abundance of personal marks and signatures, often with place and date, in Italian ceramics of the first half of the sixteenth century. Pottery of the previous century was seldom signed, while in the whole of Hispano-Moresque pottery not a single signature has been recorded.

The designer-painters travelled and worked in a certain place on contract for a year or two, and then moved on.¹⁸ Sometimes, like Xanto Avelli of Urbino, they were successful enough to employ assistants of their own. They were representatives not of any single workshop but of themselves and their art.¹⁹ Thus, when two small plates decorated with elaborate *candelieri* designs, dated 1524 or 1525, were inscribed on the backs 'fatta in Deruta', the implication is that they were the painter's personal work, not a standard Deruta design.²⁰ No Deruta painters have so far been traced before the 1530s. More is known about the sources from which the painters derived their designs. Most of the *bella donna* figures were almost certainly based on cartoons drawn from paintings by Pintoricchio. A dish representing the Virgin Mary as a child being taught by St Anne appears to be directly based on a drawing by Raphael.²¹ Several figure compositions were based on Perugino's fresco *La Fortezza e Temperanza* in the Collegio del Cambio in his native Perugia,²² and the numerous dishes painted with *Aesop's Fables* are based on Tuppò's illustrated edition of 1485.

¹⁸ The movements of several such painters have been traced. For example, see J. V. G. Mallet in 'Francesco Urbini in Gubbio and Deruta', *Faenza*, LXV, 1979, No. 6, pp. 279-96.

¹⁹ This is why Piccolpasso made no mention of such people. He was describing the permanent workshops.

²⁰ One in the Victoria and Albert Museum (1525): one in the Hermitage, Leningrad (1524) (Kube, *op. cit.*, p. 35 and Col. Pl. 44). The designs suggest that the painter came from Casteldurante.

²¹ De Mauri, *op. cit.*, p. 12 and Pl. II.

²² De Mauri, Pl. IX.

Being a new technique, lustre was used only for special designs made in short series and increasingly, from about 1520 onwards, for unique pieces.

Generally the Italian approach to painting tin-glaze pottery started with line-drawing which was then filled in with tones of colour. The structure and balance of the design as a whole depended on the drawing. By contrast, when Spanish painters represented human or animal figures they drew freely, but with little interest in detail or inflection of profile. Both approaches were capable of the highest quality of work: the idea and the method were simply quite different.

Nothing illustrates the Italian approach better than a remarkable early Deruta dish now in Faenza. This piece, painted with the head and shoulders of a young girl, must have been imperfect after the blue line-drawing had been fired in, and was used as a trial for lustre pigment. Instead of being carefully filled in, the lustre was applied with broad random strokes which leave the line-drawing and half-tone of the composition outstandingly clear (Colour Plate XXII).

This method of preliminary line-drawing was consistently followed in Deruta lustre, up to the 1550s, with the exception of a few scenic *istoriato* pieces of the 1540s, mentioned below. It is seen in the *bella donna* dishes, in armorial designs with grotesques and *candelieri*, in religious subjects such as the popular St Francis plates, in compositions with animals and landscapes such as the illustrations of *Aesop's Fables*, and also in designs consisting of repeated ornament.

At Deruta the same forms were used for both ordinary polychrome pottery and lustre. The repertoire of shapes seems to have been more limited than that of most potteries. Five forms in particular were frequently made: wide shallow dishes with a broad rim, flat or slightly concave in the central area; the *vassoio*, a shallow tray with a small rim and a central boss for holding a jug (Plate 83); the jug itself, with an applied pointed spout, handle, globular body and pedestal foot (Plate 97); the almost spherical pinecone jar with scales applied in relief, standing on a high foot; and a two-handled pedestal-footed lidded jar with a wide belly, narrow neck and wide upturned rim (Colour Plate XXV). The production and firing of these forms, on the wheel or by shaping plastic clay in moulds, was covered by the regular artisan clay-workers of the *bottega*. The biscuit vessels were then available either for painting with standard designs, or for use by specialist painters working on figures with the aid of cartoons and prints.

The incorporation of inscriptions on flowing scrolls into the composition of a figurative design is an attractive feature typical of Deruta. There must have been a reference-book for these inscriptions, taken from various sources, including the Psalms, Seneca, Petrarch and *Aesop's Fables* and traditional sayings. Some are conventional but others seem to have been chosen for an occasion or a personal relationship, such as the cryptic inscription:

CHI BEN GUIDA LA SUA BARCA E SEMPRE IN PORTO²³
(He who steers well his ship is always in port)

²³ Victoria and Albert Museum; and de Mauri, *op. cit.*, p. 1, Pl. VIII.



83. Large maiolica tray-dish with recessed centre to hold a jug, 32 cm wide: blue and golden-yellow lustre. Both the form and the design have Spanish antecedents. The latter is a more disciplined version of the Valencian *ataurique* and *margarite-flower* of the later 15th century. Deruta, first quarter of 16th century. Museo Civico, Pesaro. See page 135

The characteristic lustre of Deruta is a soft brassy-yellow, usually with a pronounced iridescence which in certain lights shimmers blue or green. The apparently early versions of this lustre are rather pale; pieces later than about 1520 as a rule have a more full-bodied, slightly warmer orange-yellow lustre. The preparation of the pigment may have been slightly changed, but it also seems likely that, as with lustre potters in other earlier centres, familiarity with the technique enabled the potters to raise the firing temperature, deepening the colour.

It was once thought that Deruta restricted itself entirely to this yellow lustre based on silver, and left to Maestro Giorgio of Gubbio the development of copper reds. In fact, a copper pigment was also used at Deruta throughout the first quarter of the sixteenth century, but sparingly. It was a pale-ruby colour and seldom had lustrous reflections. The Deruta potters did not fire lustre at a high enough temperature to develop the reds, though they could have done so had they wished. They valued the sunny-golden appearance of the yellow lustre which made their name. The pigment prepared for this seems to have contained a certain amount of copper. Though copper gives a red when fired in reducing conditions, it gives an amber-yellow in the early stages. A yellow-gold could have been obtained from silver alone, but the copper deepened the colour and kept down the cost of the pigment. If the temperature rose higher than normal, however, the silver-copper mixture would produce a reddish-orange lustre rather than a yellow-gold.

A dish now at Pesaro,²⁴ for instance, was fired unevenly; on one side the dog-tooth border is the normal brassy yellow-gold, and the other overheated side is distinctly red. This could only have happened if the pigment had contained copper. Another dish²⁵ has accidentally been flashed red from copper and a few examples are known where the lustre has gone fiery red. These cases are so rare that the effect was probably unintended.

The potters of Deruta knew what they wanted and usually achieved it precisely. The extravagance of some later lustre ware, and even that of Gubbio itself, would have dismayed them. Even the more flamboyant *bella donna* dishes have a restraint which is characteristic of almost all Deruta work. The restraint shows itself in several ways: in the compositions themselves, which almost invariably use background space to the fullest effect, allowing the figures and ornament to breathe. This balance was often lost at other Italian pottery centres, where the painters were so enthralled by their subjects that their work became crowded. There is restraint also in the limited range of Deruta colours. Many colours could have been used but the painters restricted themselves to the old Hispano-Moresque convention of '*dorado y argentado*', gold and blue only, and they knew what they were doing, for the cool blue and the sun-yellow complement one another perfectly. Again, when the Deruta painters wished to indicate modelling or relief, they avoided emphasising depth in any way which could conflict with the flat reflections of their lustre (Colour Plate XXIII).

There is a sunny airlines's about almost all Deruta lustre which shows a special feeling



84. Jug, about 20 cm high: blue and yellow-gold lustre with typical Deruta arabesques and spouting sunflowers, such as appear more generously on the open forms of dishes. City Museum and Art Gallery, Stoke-on-Trent

²⁴ *Maiolich umbre*, Pl. 7, 'The Swan and the Wolf'.

²⁵ *Ibid.*, Pl. 19.

for the lustre itself. It was used not simply as an extra colour, but with care to bring out its sun-like sheen (Plates 85 and 86). In fact, for its first three decades Deruta lustre was used principally for appropriate propitious themes and subjects, and it seems that the lustre itself actually led the Derutense to adopt themes which had literal or symbolical affinities with light and the sun.



85. *Maiolica tondino*, with deep centre and broad rim, formed over a mould, 21.8 cm wide: blue and golden-yellow lustre. The peacock-feather design, a Deruta speciality, is much more subtly arranged than appears at first glance, and the design is simultaneously static and mobile. First quarter of 16th century. Museo Civico, Pesaro.

86. *Maiolica* dish, 23.5 cm wide: brilliant iridescent silvery-golden lustre within blue drawing. The flowers within the enneagram, the diadem of rays and the leaf-and-bud design on the rim are all typical of life-enhancing, light-giving Deruta decoration. First quarter of 16th century. Museo Civico, Pesaro.



Fig. 11 Variations on the 'sunflower' theme: details from Deruta lustre

The ornament on the wide rims of the dishes is an example. The simplest and most frequent design was the dog-tooth (*denti di lupo*) which surrounds the central, figuratively painted area, like a diadem of sun-rays. In many versions the spaces between the rays are filled in with a highly formalised flower with a heavy yellow head, usually considered a sunflower. This flower form appears in various guises in many borders and bands on Deruta dishes (Figure 11) and one common border-design consists entirely of the 'sunflower' and spreading leaves.

Another frequent design was the intersecting scale-pattern, which had featured centuries earlier in Persian lustre. This design has a curious optical effect of seeming to move and it naturally suggests continuity and abundance.

Variations on the wide-spreading flower have a serrated leaf probably derived from acanthus ornament. It appears most often in wide radial panels on the rims of dishes, but sometimes it was converted into a circling border design. It is in no way a botanical flower; in fact, the flower-head varies greatly from piece to piece, but it was always represented spreading out wide to receive the sunlight.

Another type of rim ornament is known as the *metope* or a *quartieri* form. It consists of a variable number of outward-raying panels; the narrow panels are usually in pairs, enclosing a panel of repeating sunflowers, and the wider panels are filled with scale patterns of spreading flowers.

Deruta ornaments varied remarkably little over thirty or forty years. Had they been intended simply as attractive designs others could easily have been invented in response to changing fashions, as occurred in most pottery centres. That they remained the same for so long suggests that they had a significance over and above their aesthetic effect.

The subjects in the centre of Deruta dishes almost all convey a sense of spiritual blessing or life-enhancing power. Amongst the most frequent were idealised figures of young women and religious themes: the Madonna and Child and figures of angels were especially popular, and also images of St Francis (Plate 88), St Jerome and St Rocco, heroic warriors from history and legend, and formalised scenes of rural life. They all have the same bountiful vitality as the border-ornament (Colour Plate XXIV).

Though independent painters visited Deruta, leaving traces of their individual skills and preferences, the regular output was little affected by them and it seems likely that Deruta retained a dependable studio of painters whose skills were passed on over nearly two generations with extraordinary consistency. Deruta work, therefore, is particularly hard to date. Even into the 1550s the colours and blue line-drawing backed by softer tones of blue remained much the same as it had been thirty years earlier. This may have been the result of conservatism, but certainly not of inertia; to maintain a standard is often harder than to make innovations. The Deruta products of the late sixteenth century show how easily the convention of line and profile drawing could degenerate once standards were allowed to slip.²⁶

Deruta was visited by at least two independent painters who specialised in the scenic *istoriato* polychrome manner of painting. The results were not altogether satisfactory. Francesco Urbini, schooled at Urbino, worked for several years at Gubbio before he moved

²⁶ *Maioliche umbre*, Pls. 23, 30, 31.



87 Small mould-pressed dish, 11 cm wide: blue with golden-yellow lustre. The Deruta scale pattern is in relief here, and the moulding and the lustre show each other off. About 1520. Victoria and Albert Museum.



88 Large maiolica dish, 40.8 cm wide: tones of blue with iridescent golden-yellow lustre. The figure of St Francis receiving the stigmata was probably adapted from Giotto's painting, now in the Louvre, Paris. Deruta is only a short journey from Assisi. Deruta, first quarter of 16th century. Museo Civico, Pesaro. See page 140.

to Deruta, where he signed a dish with a mythological subject '1537 fran^{co} Urbini i Deruta'.²⁷ In 1541 arrived Giacomo Mancini, also from Urbino, and likewise well-versed in the *istoriato* manner. Mancini, who signed his work 'El Frate', painted a considerable number of dishes at Deruta between 1541 and 1545, and nine signed examples are still in existence.²⁸ These two painters attempted to apply the lustre technique to the convention of *istoriato* painting. Unfortunately, lustre does not lend itself to tonal gradations, and it is almost impossible to merge it into other colours; the bright reflections always make it stand out from its surroundings. At the best, the introduction of lustre into *istoriato* was an aesthetic mistake: at the worst it was disastrous.

In 1545 El Frate painted a dish with the story of Erisichon from Ovid's *Metamorphoses*.²⁹ After the firing of the normal polychrome painting he must have been well enough pleased, but then he decided to emphasise the muscles, ribs and breasts of certain figures by overpainting them in lustre. This would have looked quite appropriate while the overpainting was dry and unfired, but it became absurd once the final firing made the tentative accents shine with bright reflections. Unhappiest of all are the lines indicating the passing of life-breath from mouth to mouth; the bright-yellow lustre looks like a jet of vomit. Disturbing though such compositions seem today, they were evidently sought after, for El Frate put many of his works at risk in this way, and in the 1530s and 40s Francesco Avelli and other painters of Casteldurante and Urbino sent many classical and heroic painted scenes to be 'finished' with lustre at Gubbio. The idea was quite foreign to Deruta tradition, however, and typical Deruta fables and fair ladies and allegories continued to be produced well into, and perhaps even beyond, the next decade.

One of the most engaging of the fables or allegories is the scene, several times repeated with slight variations, of the man attempting to shave a donkey seated in the barber's chair. It is usually inscribed

CHE LAVA EL CAPO AL ASINO PERDE LA SUA PENA³⁰
(He who washes the ass's head is wasting his effort)

The popularity of this scene suggests that it referred to some current topic (Plate 89). Deruta wares often seem cryptic today because they relate to some forgotten issue of the time.³¹ The potters and painters of Deruta responded to the local community, and much of their work was destined for use or display in churches and households nearby.

An intriguing product of these local exchanges is a curious doggerel poem addressed to the Deruta master-painter in about 1550. The writer, claiming to be devoted to beautiful women, and also to the prosperity of the potters, recommends the painter to celebrate local

²⁷ Mallet, op. cit., Pl. XCVII a and b.

²⁸ *Maioliche umbre*, p. 64.

²⁹ Kube, op. cit., Pl. 48 (colour).

³⁰ Examples are in the Victoria and Albert Museum, the Cluny Museum, Paris and Coll. Magnini, Deruta (de Mauri, Pl. XXVIII).

³¹ e.g. A. Caiger-Smith, *Tin-Glaze Pottery*, Pl. 64.



89. Maiolica dish, 39 cm wide: blue with iridescent golden-yellow lustre. Deruta, dated 1556. By courtesy of the Victoria and Albert Museum. See page 142

people on the *bella donna* dishes. Was this an affectionate game, or were reputations lost by it? In any event, it indicates the many and long-forgotten personal, local connections which lie behind a craftsman's work, then as now:

To the Master of the Studio at Deruta

Master of pots I give you the following advice
If you wish to sell your work quickly,
these you will paint, whom I hold in great regard
because they came down to us from paradise.

Verily I tell you, I am not just making it up
that at Todi more beautiful women than these are not,
never will be, and never existed,
for they all have the looks of Narcissus.
I write them down for you here below one by one.
Good wishes to your little furnace,
good fortune be not against you.
Work slowly and not in haste
and choose the right phase of the moon
so that you won't be left even with a tiny cup.

The first worthy pair,
Colonna Perugina, bounteous Baldesca
And Mr Gabio's madonna Francesca,
Do not have qualms about inscribing (them) often,
with the well beloved Braccio
the little Francesca who is Bartolaccio's love.
Don't feel embarrassed to paint
Ortentia, Celidonia and Filomena
etc. etc.

... (here follows a long list of names in rhyming verses).

I wish to tell you that on the 15th of the month
I must go to sleep in the city of Todi
In this year of 1557.
I entrust myself to whomsoever shall read or listen to this;
it was written without guile by Andreano
who always loved the most beautiful women and is faithful
servant to them all.³²

³² Literal translation from the Italian, from 'Un breve Componimento poetico del Sec. XVI', *Faenza*, 1934, pp. 110-13.

Lustre continued to be made at Deruta until about 1670 but without new inspiration from the painters or any significant challenge from its patrons. It is interesting only as merchandise and the sad decline of the art only emphasises its past glory.

Only two other centres appear to have produced lustre in Italy in the Renaissance period: Cafaggiolo, near Florence, and Gubbio. The rare examples of Cafaggiolo lustre are finely made and designed and the lustre is of beautiful quality, with a rather different surface from that of Deruta and Gubbio. The Cafaggiolo workshops were started by a branch of the Medici family about 1500, and almost all its production seems to have been intended as pieces of *virtù*, meant for display rather than for use. The surviving lustre dates from about 1518. Considering its quality, it is surprising that so little seems to have been made. Perhaps the designers found it hard to resolve the conflict between the lustre surface and the three-dimensional ornament in which the painters excelled. Cafaggiolo lustre remains something of a mystery (Plate 90, A and B).

The town of Gubbio began to be known for lustre in the first decade of the sixteenth century. There is little doubt that the technique was acquired from Deruta. The towns lay only about fifty kilometres apart and they had many family and commercial connections.

No record exists of the ownership of the Deruta lustre workshops, whereas Maestro Giorgio Andreoli, the founder-proprietor of the Gubbio lustre manufactory, is probably the most fully documented individual in Renaissance ceramics, which may indicate something of his character. He was born near Lake Maggiore and is said to have been trained in a



90A, B. Two aspects of a two-handled vase, about 22 cm high: matt, slightly iridescent greenish-yellow lustre on tin-glaze. Monogram SP on the side. A rare example of Cafaggiolo lustre of about 1520, perhaps over-fired. Musée National Céramique de Sévres.



Fig. 12 Vessel forms of Deruta and Gubbio lustre. None of these were made in such large numbers as the popular plates and dishes.

- A Two-handled cup, about 18 cm high
 B Ceremonial jug, about 20 cm high (*versatorio*)
 C Lidded jar with pedestal foot, about 26–36 cm high
 D Pot with two handles, probably originally with a lid, about 28 cm high (*vaso biansato*)
 E Small dish with wide flat rim and recessed foot, about 22 cm wide
 F Bowl on a deep foot, about 25 cm wide
 G Bowl on a deep foot, about 25 cm wide

Faenza *bottega* before coming to Gubbio as a young man. Having resided there as potter for several years, he and his two brothers were given citizenship in 1498, together with exemption from taxes for the following twenty years³³—a privilege which was offered to many skilled artisans at that period, with the aim of developing the resources of the area.³⁴ There is no suggestion in the deed of privilege that the Andreoli brothers made lustre at that time. Maestro Giorgio was simply mentioned as 'a master of the potter's art'. For the next seventeen years all that is known is that in 1510 the brothers were paid for a consignment of ordinary pots supplied to the Monastery of San Pietro.³⁵

However, within a year or two they were producing elaborately painted ware decorated

³³ For the Latin privilege of citizenship see *Maioliche umbre*, p. 23.

³⁴ Mazzatinti in *Maioliche umbre*, as above, p. 66.

³⁵ *Ibid.*



91. *Maiolica* dish, about 24 cm wide, marked on the back with a hand holding a halberd: blue with bright iridescent greenish-golden and ruby lustre, dated 1515. The earliest dated example of the formal, neoclassical grotesque designs which made Gubbio and Maestro Giorgio famous. By courtesy of the Victoria and Albert Museum.

with three lustres, silver, golden and red, together with painting in blue and green. The earliest known dated piece is marked 1515 in lustre on the back (Plate 91). This dish shows signs of faulty firing, as do two others that seem to be of the same period,³⁶ suggesting

³⁶ One is in the Victoria and Albert Museum, Rackham, *Catalogue*, no. 512. It is distinctly greyed all over by excessive reduction.

that the lustre technique may still have been fairly new (Colour Plate XXXn). The next ten years were intensely productive, and during this time Maestro Giorgio made his name (Colour Plate XXVI). Pope Leo X wrote to the Commune of Gubbio on 20 July 1519 recommending that Giorgio Andreoli should be encouraged to remain in Gubbio, by renewal of his exemption from taxes 'because of the honour and profit he brings to the City'. He was described in this document as 'the excellent Master of the art of lustre (*in arte maiolice*) . . . without an equal'.³⁷

The title was not quite fair to the Deruta masters, but Maestro Giorgio was undoubtedly an 'excellent master'. At its best, his red lustre is a stupefying red-beyond-red, and has never ceased to be wondered at. Many lustre reds have been made since, but never one like his. This was the red that the lustre revivalists of the nineteenth century regarded as the ultimate measure of success and continually tried to equal, but though they had the advantage of the help of professional chemists, they never matched it.

The workshop prospered until in 1536 Giorgio handed over control to his son Vincenzo, who ran it with the help of his brother Ubaldo. Without their father's direction the quality of the work declined rapidly. There is an interesting document of 1547 in which their partnership was renewed, giving Vincenzo (Cencio) responsibility for making the vessels (and, presumably, for firing them) while Ubaldo directed the painting.³⁸ Piccolpasso described the lustre technique in his *Three Books of the Potter's Art*, and acknowledged Cencio as the source of his information (Plate 93).³⁹ Cencio made his will in 1576, and the production of lustre appears to have come to an end. It was revived in the 1850s.

The story of Gubbio lustre is thus virtually the story of Giorgio Andreoli, but it is extremely difficult to know how much of the pottery was his personal work; he may have been simply a very able administrator and entrepreneur. The Gubbio pottery was a celebrated family business; its public relations were handled with considerable flair and in addition to its own production it ran a profitable trade in adding lustre to fine wares from Casteldurante and Urbino. In contrast to the work of Deruta, Gubbio pieces were often inscribed with dates and initials, usually a bold 'M^oG^o' (for Maestro Giorgio) and quite often with the name of the city (Plate 92). Many of these pieces were made elsewhere and were only lustred at Gubbio, so that the mark M^oG^o was in these cases a kind of finishing trade mark, not the mark of the maker. There are also several examples with two dates, sometimes of consecutive years, one in ordinary colour and one in lustre; these were almost certainly made entirely at Gubbio,⁴⁰ but the variety of styles suggests that they were painted by different people. Thus, while it is possible that some were Maestro Giorgio's own work, it is likely that most if not all the Gubbio production was by painters in his employment, although the epithet 'the excellent master of lustre' was applied to him personally.

³⁷ *Maioliche umbre*, p. 24.

³⁸ G. Mazzatinti, 'Maestro Giorgio', *Il Vasari*, Anno IV, 1931, p. 110.

³⁹ *The Three Books of the Potter's Art*, as above, vol. II, p. 86.

⁴⁰ e.g. Rackham, Cat. Nos. 642, 664-5 (pair), 666, 670.



92. Back of a maiolica dish, 29 cm wide. Maestro Giorgio's mark in ruby lustre: '1526 M^oG^o da Ugbio'. By courtesy of the Victoria and Albert Museum. See page 148.



93. Firing the lustre kiln. Piccolpasso's drawing, *Arte del vasaio*, f. 49v, showing the final stages of the firing, when the fuel is changed to reduce the pigments. The man with the tongs is extracting a trial piece. By courtesy of the Victoria and Albert Museum. See pages 148, 207-208, 214 and 216.

Some remarkably good and some remarkably bad pieces came from Maestro Giorgio's workshops. Gubbio lustre exploited the rich, dramatic possibilities of the medium in a flamboyant manner radically unlike the restraint of Deruta. In further contrast to Deruta, Gubbio's products varied greatly during the workshop's fifty years of activity; they appear to have followed the market. Nonetheless, several of its specialities can be singled out.

The early pink and amber-silver lustres attributed to Gubbio are very like Deruta work and it is hard to distinguish between one and the other. Gubbio made its name between 1515 and 1525 with the elaborately designed dishes already mentioned, including red, silver, and golden lustres and blue, and touches of green and other colours. Many of these dishes feature armorial emblems combined with swirling grotesques, cornucopias, serpents, fruit and leaves, trophies, *putti*, and other symbols of prosperity derived from wood-cuts and engravings. In addition, a number of dishes with figures in ordinary polychrome, and just a few details picked out in lustre, were also made during this period.⁴¹

Gubbio also produced jars, two-handled vases, and dishes with relief ornament such as fluting, bosses, gadroons and cabling, suggested by *repoussé* metalwork (Plates 94 and 96). The moulding, painted with lustre, contrasted with the white or blue-painted ground, which emphasised the modelling and enhanced the reflections. Similar forms were made at Deruta, but at Gubbio the moulding was usually more pronounced.

From about 1526 until at least the 1540s Gubbio made a great many small dishes with a wide flat rim and a small, deep, rounded well in the centre (Plate 95). The rim was elaborately decorated in blue, often with touches of grass-green, orange and red, and with golden or silvery lustre, and the centre usually contained an armorial device or the figure of a *putto* with an emblem. Many of these were made as love tokens and to commemorate marriages. One of the first is a carefully designed piece dated 1518 in three places.⁴² As the production increased, the design and execution became slipshod.

One of Gubbio's most profitable ventures, already referred to, was the application of lustre to pottery painted with *istoriato* subjects or grotesques from Urbino and Casteldurante. They were much in demand from about 1520 to 1550. The most celebrated examples were painted by Xanto Avelli and his assistants at Urbino, and they were based upon his personal reference library of prints.⁴³ As Renaissance writers themselves said, art consists not merely of the execution of a work but also of its underlying conception. By this criterion, Xanto Avelli's work was entirely derivative.

To describe any work as 'derivative' today is to damn it, and *maiolica* specialists such as Xanto Avelli are often disparaged, but men of the Renaissance thought in a different way. Prints were undoubtedly used by some pottery painters to make up for their own shortcomings and to save themselves trouble. By others they were used as a starting point



94. Mould-pressed *maiolica* dish, 21.5 cm wide: blue with golden and ruby lustre. It is difficult to see whether the lustred moulding is concave or convex, and this teasing of the eye was deliberate, as in some modern 'op-art'. Gubbio about 1515–20. By courtesy of the Victoria and Albert Museum. See pages 150 and 192



95. Small dish (*tondino*) with wide flat rim, about 20 cm wide: blue and green with red and golden lustre. Gubbio, dated 1527. Musée National de Céramique, Sèvres. See page 150

⁴¹ Amongst these is the famous Judgement of Paris dish, dated 1520 (Musée du Petit Palais, Paris); also the dish of the Three Graces, dated 1525 (Victoria and Albert Museum, London), and the dish of Diana Bathing, dated 1525 (Wallace Collection, London). They are based on engravings by Marcantonio Raimondi.

⁴² Museo Statale, Arezzo, illustrated in *Maioliche umbre*, Pl. 40.

⁴³ See J. V. G. Mallett, 'Francisco Urbini in Gubbio and Deruta', *Faenza*, LXV, 1979, no. 6, p. 281.



96. Two-handled maiolica jar and cover, 26 cm high: blue with golden and ruby lustre. The three tiers of the jar were mould-pressed and joined at the horizontal ridge, in imitation of repoussé metal, but the colourful decoration introduced a completely different mood. Moulded forms were seldom as agreeably proportioned as this example. Gubbio, about 1515. By courtesy of the Victoria and Albert Museum. See page 150



97. Maiolica pitcher, 24 cm high: soft blue, silvery lustre and pale-ruby stain. A rare example of the kind of jug placed on a tray-dish as shown in Plate 83. Deruta and Gubbio styles were often very similar, and this piece could have come from either town. By courtesy of the Victoria and Albert Museum. See page 135

for work which was partly original. Derivation in this sense is as old as art itself.⁴⁴ In the Renaissance derivation had other motives as well. The painters borrowed from prints partly because of their genuine admiration for the works of the great masters of the art of painting, Raphael especially, who were not yet 'Old Masters', but in fact very new. Raphael died only in 1520, in his late thirties. In Raphael his contemporaries (and, indeed, many people since) saw not only a genius, but the ultimate master of the human form and its expression. As Vasari wrote 'Now for us, who remain after him, it remains to follow the Good (*imitare il buono*) of which he has left to us the supreme examples . . . nor can any spirit consider it possible ever to surpass him.'⁴⁵ When pottery painters followed Raphael, therefore, it was meant partly as an act of homage, and was not simply borrowing for convenience. Nevertheless, it was homage to something they did not really understand. They lifted figures out of context, but few of them had any conception of the picture-space, the structures and rhythms of the original compositions, nor of the significance of the subjects. The sublime models descended to the vernacular.

One of the pottery-painters' major difficulties lay in converting a monochrome print into colour. They had authority for the figures but none for the colour; furthermore, their ceramic pigments could not be graded precisely, like the colours of the fresco painter, and they became completely altered in the firing. Over-colouring was the principal weakness of the convention of *istoriato* ceramic painting, and the addition of lustre to an *istoriato* scene was the greatest departure of all from the original model. The Deruta painters were perhaps wise in maintaining a generally limited range of colours, in spite of the pressure of fashion. At Gubbio the painters responded to fashion and reaped their reward. The best of the products remain pottery classics, but much of their later work now seems overblown.

There was always a conflict between the line and tone required for polychrome painting on tin-glaze, and the completely different colours and surfaces introduced by lustre. This conflict may have played a part in the rapid decline of lustre from about 1550, but the decline is equally likely to have been occasioned by events outside the potters' world altogether. By that time, precious metal from the plunder of the Americas once again enabled men of wealth to furnish their walls and tables with real, not seeming, gold.

General knowledge of a technique is easily enough conveyed in words. The actual manipulation of tools and materials may be difficult to pass on except by demonstration. When can a metal be bent without splitting? When is hot glass ready to be blown? How thickly should a glaze be applied? What is meant by 'dull red heat'?

Someone with this kind of knowledge appears to have brought the lustre technique from Deruta to Gubbio, and in a similar way it was transmitted from Gubbio to Gualdo Tadino,

⁴⁴ Picasso once said, 'One must take one's good where one finds it, except in one's own works. I have a horror of copying myself but I have no hesitation, when I am shown for example a portfolio of old drawings, in taking from them whatever I want.' See 'Conversations with Picasso', *Cahiers d'Art*, Paris 1935, translated by Brewster Ghiselin.

⁴⁵ *Mateliche umbre*, p. 43.

about thirty kilometres to the south-east, around the middle of the sixteenth century, when the Andreoli workshop was in decline (Plate 98).

Only a few examples are known⁴⁶ and their attribution to Gualdo has been questioned, but there is documentary evidence that a family of potters known as Biagioli and Monina produced lustre in golden-yellow and deep-red until the end of the seventeenth century.⁴⁷ The strongest evidence of a local lustre manufacture is that of the twenty-six tiles mortared into the façade of the Church of the Madonna del Piano, near Gualdo, when it was built between 1663 and 1666. Some of the tiles were first fired with a simple star design in blue.⁴⁸ A strong-red lustre was added in a succeeding firing. During the reduction the blue, which must have contained some copper, was reduced to a mauve-purple. This suggests that the reduction temperature was higher than that earlier employed at Deruta and Gubbio, where the blue always remained unchanged. Thus a local variation of the original technique seems to have developed at Gualdo, outlasting the lustre of Gubbio by about a hundred years.



98. A small moulded dish, 24.9 cm wide; with a greenish tin-glaze, blue, manganese-brown and deep-ruby lustre. In the centre a crude figure of San Bernardino of Siena kneeling before the Sacred Monogram, with a border derived from the Deruta *a quartieri* convention. Possibly from Gubbio, though the unusual glaze, the coarse painting, and the dense lustre suggest Gualdo Tadino manufacture of the later 16th century. Museo Civico, Pesaro.

⁴⁶ Nine pieces from the collection of Marchese Gianpietro Campana, sold in 1858 (*Maioliche umbre*, p. 83).

⁴⁷ *Maioliche umbre*, p. 84.

⁴⁸ *Ibid.*, p. 82, fig. 1 (in colour).

9

REVIVAL

It is often difficult to explain why things happen but to explain why they do not is usually harder still. Why was lustre not followed up in the later sixteenth and seventeenth centuries? The knowledge and practical experience were available but they were not called upon. Gubbio appears to have made no lustre after about 1570; some Deruta workshops persevered with it in a provincial manner until about 1630, and some rather crude lustre continued to be made at Gualdo Tadino until about 1660, but none of it was of any interest to the kind of people who had supported the lustre-makers before. In Spain the art survived in the eighteenth century, but with ever-diminishing patronage, and the foreign trade which had once brought wealth to Valencia and Barcelona almost completely died out.¹

Why did fashions change? Was it because people of wealth could now more easily furnish their tables with real gold and real silver? Was it because customs of feasting and entertainment had changed, or was it simply that lustre ware had become familiar and was no longer up to date? Many people must have valued old lustre enough to look after it, or the fine examples which are in collections today would never have survived, but they did not commission anything new. In other fields of manufacture gold and silver kept their time-honoured appeal, but by the time faience tableware became fashionable around 1700 the old lustre was completely out of fashion.

Thus the tradition of reduced, iridescent lustre never moved into northern Europe as the tradition of the painted tin-glaze wares had done. The chain-relationship of master-and-pupil never passed the Alps or the Pyrenees.

Taste moves in a fickle manner. It was at this very period that European fashion began to develop an interest in tableware with gilded surfaces, in a style very different from the old lustre and with a different kind of sheen. It was gold, real gold, that was wanted, not iridescent lustre. The process began about 1680 and was accelerated by the development of porcelain in the eighteenth century. Japanese Imari enamels were being gilded for the European market by about 1680; Dutch delftware was occasionally gilded, and the porcelains of Meissen and Vincennes often had finishing touches of gilding added to their enamel decoration to make them suitable for the tables of royalty and the aristocracy. The gilding

¹ Lustre ware dredged from the river Avon at Bristol in the eighteenth century was at one time thought to have been made at Bristol and was called 'Bristol Lustre'. The pieces were in fact damaged vessels thrown overboard by sailors on Spanish ships trading with Bristol. They were of no interest whatever to Bristol citizens of the time.

was gold-leaf or powdered gold, attached with size or lightly fired on to the ware with a flux of sodium silicate. This firing was done in an oxidised, clear atmosphere in a muffle-kiln. The gilding was expensive and it wore off fairly easily.

Well before the middle of the eighteenth century many manufacturers in Germany and France were experimenting to discover a more efficient way of decorating pottery with gold.² In England the first Josiah Wedgwood began to tackle the problem in 1765, when he received an order from Queen Charlotte for a teaset decorated with flowers on a gold ground.³

Wedgwood was well aware of the commercial value of a sound method of applying a metallic finish to pottery, and as early as 1769 he took out a patent for 'ornamenting Earthen and Porcelain ware with an Encaustic Gold Bronze'. This patent appears to have been a fairly well-known method of fluxing finely divided gold and copper powder to a glaze, and he never tried to enforce his rights as the first patentee.⁴ Curiously this interest led his partner, Thomas Bentley, to investigate for a while certain effects which must have been closely related to the old reduced-lustre tradition. In 1772 Bentley entered in his London Experiment Book notes on 'experiments to produce prismatic colours on the surface of glazed vessels by the partial reduction of the metals in the glaze'.⁵ Josiah Wedgwood commended these experiments but they do not seem to have been developed. As will be seen a little later, almost a century passed before they were followed up. For the time being attention was directed to the relatively easily controlled methods of muffle-fired lustres made from the noble metals.

Various methods were used to decorate pottery with finely ground gold, known as mussel gold, and powdered gold blended with soda and bismuth fluxes and mixed with fat oil of turpentine. The gold had to be burnished after being fired on.⁶ A cheaper and more reliable method was soon devised. It involved using a preparation based on gold and platinum, dissolved in *aqua regia* (a blend of nitric and hydrochloric acids), and suspended in resin-medium. The medium burnt away in the firing, and reduced the metal compounds to pure metal. A brilliant film of metal remained on the surface of the glaze, so thin that an entire vessel could be covered with gold or platinum at only a small cost.

Wedgwood's had obtained use of this technique by 1805. Two ornate pastille-burners, still in existence, have the Wedgwood name and the date 'Feby. 2nd 1805' impressed on the base, and are lustred all over in bright metallic gold.⁷ From this year onwards dissolved gold and platinum preparations were used increasingly in the Staffordshire potteries for simulating gold and silver. The earthenware forms were often close imitations of metal vessels (Plate 99). Wedgwood's did not invent the technique any more than the other proces-

² L. B. Hunt, 'Gold in the Pottery Industry. The History and Technology of Gilding Processes,' *Gold Bulletin*, 12, (3), 1979, pp. 116-27.

³ *Ibid.*, p. 123.

⁴ W. D. John and Jacqueline Simcox, *Early Wedgwood Lustre Wares*, Newport, Mon. 1963, pp. 2-3.

⁵ John and Simcox, as above.

⁶ See Kenneth Shaw, *Ceramic Colours and Pottery Decoration*, London 1962, pp. 60-2.

⁷ John and Simcox, *op. cit.*, Pls. 14, A, B, C.



99. Coffee-pot, 21.5 cm high: liquid platinum resinates over clear-glazed red earthenware, imitating silverware. A fine example of the metal lustre made in many Staffordshire potteries in the early 19th century. City Museum and Art Gallery, Stoke-on-Trent. See page 156

ses they used. Almost all the methods they used were current, and sometimes used better, in other Staffordshire potteries, but the Wedgwood products were promoted with an exceptional flair so that the firm's name became associated in the public's mind with every major development in pottery manufacture.

At first the noble metals were usually applied as an overall covering, but within a year or two they were being used also as painted decoration and over painted resists, which displayed the platinum finish in a particularly attractive way. Simeon Shaw, in his *History of the Staffordshire Potteries*, 1829,⁸ said of the technique 'since 1804 it has been practised with varied success thro' the whole of the district'.

Wedgwood and the other manufacturers almost certainly owed this technique to John Hancock, who had developed it at the Spode factory a few years earlier. Hancock spent the whole of his working life in the potteries as a colour specialist, and from 1816 until his retirement he managed the Wedgwood enamelling department. Though the discovery of the liquid golds and platinites has on occasions been attributed to others, the claim which Hancock made in a remarkable letter in the *Staffordshire Mercury* of 1847, the year before his death, has never been disputed. In Hancock's honour his letter deserves to be quoted in full:

⁸ London 1900, p. 229 (reprint edition).

Sir, In the notice of the death of Mr John Booth of Well Street, inserted in your last week's paper, it is stated that he was the inventor of lustre for earthenware. I beg to state that this is incorrect as I was the original inventor of lustre, which is recorded in several works on potting, and I first put it into practice at Mr Spode's manufactory for Messrs Daniels and Brown and continued to make it long before Mr Booth or any other person attempted to make it.

If Mr Booth's friends should doubt the truth of this statement, I shall be very happy to furnish them with proof on the subject, or answer any questions which they may think proper. Perhaps Mr Booth's friends are not aware that I am still alive, although at an advanced age of eighty-nine. By inserting this you will oblige one whose character is at stake.

John Hancock, Etruria⁹

John Hancock's receipt is no longer known, but variations of it circulated extensively in the English pottery industry, and one of these was printed by the widow of Thomas Lakin in 1824. Her husband had managed the Leeds pottery in about 1808-10 and introduced lustre there. The receipt, being based on the noble metals, is for a non-tarnishing metal finish without iridescence. The preparation and materials are very different from those of the 'changing' or iridescent silver and copper lustres with which this book is mainly concerned, but the two types of metallic deposit are sufficiently alike for their stories to interact, although they are technically quite distinct.

Lakin's preparations are quoted in full on pages 219-20. They could be painted on a glaze or, alternatively, the ware could be entirely dipped in them to be given a metallic finish all over. To obtain a resist design, the decoration was painted with size or some other soluble material before the pot was coated. Once coated, the pot was washed and lightly rubbed. The coating fell away where it lay over the soluble material.

The early noble-metal preparations were less concentrated than those of today. They gave rich gold and silvery surfaces on dark grounds, but on light-coloured clays and glazes the effect was purplish-pink instead of gold and steely-grey instead of silver.¹⁰

Thomas Lakin's receipts soon became widely known in Staffordshire, but since colour-makers were not always willing, or even able, to buy the printed version, many varieties circulated by word of mouth and some were unsatisfactory. The film of metal did not always adhere properly to the glaze, a problem which was later solved by adding bismuth compounds or other fluxes. Sometimes the metal was unstable because the acids had not been washed out when the mixture was prepared. Stable or otherwise, liquid golds and platinum were being extensively used by the 1830s in many Staffordshire potteries and also at Bristol, Sunderland, Newcastle-upon-Tyne, Swansea and Liverpool.¹¹ The makers were able to

⁹ John and Simcox, *op. cit.*, p. 14. Details of John Hancock's career are given on pp. 15-16.

¹⁰ John and Simcox, *op. cit.*, pp. 19-22. For modern methods, see K. Shaw, *op. cit.*, pp. 69-74.

¹¹ G. Bemrose, *Nineteenth Century English Pottery and Porcelain*, London 1952, pp. 13-15.

obtain varieties of golden colours, silvers, pinks, greys and plum-colours from the noble metals, and an opalescent bismuth lustre,¹² but they could not make a rich deep-red. It is even now not clear why this colour cannot be developed from a dissolved gold and copper resinate but, in effect, it was not forthcoming. The industry was keenly aware of its absence, partly because rich reds had always been the most elusive of ceramic colours,¹³ and partly because some mysterious process of social aesthetics was making Europeans of the mid-nineteenth century peculiarly sensitive to the hue of this colour. It began to appear throughout the Continent on almost every kind of interior furnishing, in curtains, carpets and leatherwork, in dresses and uniforms, on coaches and the new railway-carriages and on machinery. By 1850 every pottery manufacturer knew that there was money in a good red lustre. At this point the old traditional technique of reduced lustre and the newer metallic 'lustres' derived from the noble metals once again came together. The rich red which eluded the English industrial potteries was at that time being redeveloped on non-industrial tin-glaze *maiolica* in Italy.

An account of the revival of lustre in Italy is given a few pages further on because it is of interest in its own right. It is sufficient here to mention that Pietro Gai, director of the firm Benucci e Latti of Pesaro, had for several years experimented with reduced lustres and was believed to have rediscovered Maestro Giorgio's famous ruby-red by 1848.¹⁴ In the 1850s Gai was manufacturing tableware decorated with liquid gold and platinum and was awarded a medal for it at the first Fine Art Exhibition in Florence in 1861. Gai was therefore eager to visit the famous English Staffordshire potteries. When in 1862 the provincial government of Pesaro offered to sponsor a visit to England, he accepted eagerly, hoping that somehow this connection would bring with it a financial reward which he had never achieved in Italy, despite his reputation as a modeller and decorative designer. In Staffordshire Gai visited the Wedgwood, Copeland and Minton factories and several others, but none of them were interested in engaging him as a designer. His ruby-red lustre, however, did interest them, and at Etruria on 2 August 1862 he sold to Wedgwood's his receipts for ruby-red and golden lustres 'together with drawings of the kiln, methods of manipulation, etc.'¹⁵ His Italian friends were aghast and believed that he could only have done such a thing because his mind was disturbed by the long journey and by illness.

Wedgwood's paid £20 for the receipts and cautiously agreed to pay a further £20 once they had obtained good results from them, whereupon they would pay a further £10 for the exclusive rights for their use.¹⁶

¹² In 1856 the French chemist J. J. H. Brianchon patented an opalescent bismuth lustre. It was really an adaptation of the Staffordshire noble-metal resinate preparations, the gold and platinum being replaced by bismuth nitrate, dissolved in a sulphur balsam. The firing deposited on the surface of the glaze a fine film of metallic bismuth, which easily wore off.

¹³ Until the development of reds based on cadmium-selenium in the early twentieth century.

¹⁴ Ferdinando Spadoni, 'Cenni Storici in torno al risorgimento delle pitture in maiolica nella Città di Pesaro', in Giuliano Vanzolini, *Storie delle fabbriche di maioliche metaurensi*, Pesaro 1879, p. 356 et seq.

¹⁵ Spadoni, as above, pp. 358-9.

¹⁶ The Wedgwood-Gai correspondence is in the Wedgwood archives at the University of Keele. I am grateful to the curators of the Wedgwood Museum for providing photocopies of it.

Gai's receipts were sulphides finely ground with Armenian bole (rich red ochre). The correspondence suggests that the kiln was based on Piccolpasso's drawing of the old Andreoli kiln at Gubbio. Despite Gai's careful instructions, Wedgwood's never obtained the ruby-red from his preparations, only a poor yellow stain and a wretched black colour.

Back in Italy, Gai was anxious. He was short of money and hoped that the balance would soon be paid. He was convinced that the failure must be due either to faults in the construction of the kiln or in the method of firing it, and on 10 November 1863 he sent further instructions. He may have been partly right, but it is more likely that the Wedgwood glaze needed to be fired slightly differently and that Gai, being familiar only with Italian *maiolica* glazes, did not understand the real problem. His letter (quoted on pages 216–18) is interesting in that it amounts to an account of the firing technique used in the Italian lustre revival, based on the sixteenth-century report made by Piccolpasso quoted on pages 212–14.

Pietro Gai died, disappointed, in 1866. Wedgwood's were also disappointed, but for them this trying episode was not the end of the story. In 1865 the celebrated French ceramic painter Emile Lessore, who had been engaged by Clement Wedgwood to take charge of the art ceramics of the firm, reopened the idea of reduced ruby-red lustre. Lessore built himself a special kiln for lustre experiments at his home in France; Clement Wedgwood made his own trials at Etruria, and they exchanged enthusiastic letters.

Mr Clement, Your ruby is excellent, I admire the clarity of your colour. My colour is pale but I am not preoccupied about this because I know it is through lack of heat. What is more, I have only composed it of copper, and a mixture of silver nitrate is needed. My colour of copper resembles the Moorish ones, whereas your ruby is more like Maestro Giorgio's.¹⁷

Four trial pieces, one of which is dated 11 May 1866, are preserved in the Wedgwood Museum. They are smudged and discoloured by smoke, but they show an effective ruby-red and golden-orange lustre, far better than anything made during the association with Gai. One cannot help wondering how much use they made of poor Gai's original receipts and instructions, but unfortunately Clement Wedgwood's notebooks for the 1860s do not include any technical details. By this time he must have decided that the lustres could only be used for non-repeat 'art' ceramics, not for regular manufacture; otherwise they would almost certainly have been included in his comprehensive records. The experiments did not proceed very far. After 1866–7 the firm appears to have lost interest in reduced lustres until the 1890s, when they were used for individual art-pieces by Lessore's daughter, Louise, and her husband, Alfred Powell, who continued to use them up to about 1920.¹⁸

By this time other firms had been more successful. Minton's had obtained a deep reduced ruby-red by the early 1870s, as seen in the large dish of the *Emperor Hadrian*, painted

¹⁷ Quoted from Maureen Batkin, *Wedgwood Ceramics*, London 1982, p. 53.

¹⁸ They also used liquid gold and platinum resins, as in the examples of their work in the Victoria and Albert Museum.

by F. W. Moody on clear-glazed white earthenware,¹⁹ but the iridescent reduced reds were not dependable enough to appear in the firm's industrial production.

In the 1880s William De Morgan produced striking ruby-reds in his workshops at Fulham and Sands End, but he too found that the overall reduction from the fire gave very variable results. The lustre was sometimes rich and deep, but it could also come out pale, or a dull, heavy lustreless red. This did not matter greatly to De Morgan, whose work belonged firmly in the art-ceramics field, but it discouraged many intending industrial manufacturers whose products had to be more consistent.

Several firms attempted it, in particular Maw and Co of Jackfield in the 1880s and 1890s, and Pilkington's Royal Lancastrian Pottery in Manchester, under William Burton and Gordon Forsyth, in the early years of the twentieth century.²⁰ Maw's products, many of which were designed for hand-painting by Walter Crane, were usually only slightly iridescent, and were not helped by the clear-glazed yellowish clay-body, but a successful lively red lustre was occasionally obtained (Plate 100). The Royal Lancastrian Pottery produced impressive lustres: red, golden, silvery and opalescent, from 1902 until 1937. They



100 Bottle, 25.5 cm high: tones of red lustre over clear-glazed white earthenware by Maw and Co of Jackfield, about 1888. According to William Burton some lustre receipts were brought to Jackfield by a former assistant of William De Morgan. City Museum and Art Gallery, Stoke-on-Trent.

¹⁹ Victoria and Albert Museum, Mus. no. C280–1921.

²⁰ William Burton said in his lecture to the Society of Arts that De Morgan's techniques were also used by Craven Dunhill & Co. of Jackfield, Messrs J. C. Edwards of Ruabon and by Carter & Co. of Poole.

found, as everyone else had done, that the effects were too variable to be used in the firm's regular factory production. In fact, no company or studio in modern times has managed to achieve the consistency of results which were sustained by the Manises potters and Maestro Giorgio in the sixteenth century. Nor have they been able to rival the outstanding examples of Gubbio ruby-red, which is not just a rich red: it is a breath-taking red, only believed by seeing.

By the late nineteenth century a reliable red resinate lustre composition was available for use with oxidised firing in a muffle-kiln,²¹ and varieties of it are available today, but it has never even approached the depth and resonance of the best of the old reduced-lustre reds. The nearest industrial approach to their quality came in the 1890s from Vilmos Zsolnay in Hungary and the French ceramic-chemist, Louis Franchet, who made lustrous reds by reducing alkaline glazes containing a small percentage of copper. The lustre glazes, however, still required overall reduction and were by no means invariable, nor did they satisfy modern industrial standards of resistance to abrasion. There is still no industrial equivalent for the best of the old ruby-reds. Pietro Gai's problem remains unsolved even after a hundred and twenty years.

While these experiments were afoot, the pursuit of ruby-reds and other lustres had taken a very different course in Italy, and was soon to be followed up by a number of people, mostly working as individual artist-ceramicists rather than for industrial firms. All these individuals followed their separate impulses and were often unaware of each other's existence. Though they all responded to a certain general aesthetic appetite of their age, they do not represent a consistent movement and each one deserves some individual notice.

Italy

Though some kind of bronze-coloured lustrous finish is said to have been discovered by a certain Marino Frongini at Pesaro as early as 1812,²² the metallic gold and platinum lustres only became current in industrial production from about 1860 onwards, long after they had become familiar in England.

The main impulse behind Italian lustre lay in the realm of fine-art ceramics derived from the supreme examples of the *cinquecento*, and was followed up at Pesaro, Deruta, Gubbio and Gualdo Tadino from the 1870s onwards. However, this production depended on the rediscovery of the smoked-lustre technique itself, which had occurred some time before.

Pietro Gai of Pesaro had been working fitfully on the idea since 1830 and is credited with the first rediscovery in 1848.²³

However, Luigi Carocci of Gubbio, working with the help of the chemist Angelico Fabbri, was also praised as the first rediscoverer in 1856, in a public address delivered to the Minister

of Commerce and Fine Arts, an event which the loyal Pesarese regarded as a scandal and an insult to their city. In effect, neither of the supposed rediscoverers followed up his 'secret'. The first ceramic artist to do so was Terenzio Bertozzini of Pesaro (1813–1900). He began his career as a skilled thrower and later as furnace-master at the old Pesaro firm of Callegari, and in 1854 he joined Pietro Gai's firm. There he was inspired by Gai's experiments with iridescent reduced lustres. Bertozzini built a small kiln at his home in order to pursue the technique more fully, but in 1858, still dissatisfied with his results, he returned to employment as a furnace-master, this time at the Ceccarelli factory in Gubbio. There he obtained a fuller command of the method, and after two years he joined the small firm of Anselmo Ugolini in Urbino, where he worked methodically in golden and ruby-red reduced lustres from 1860 to 1865.

This story implies that Pietro Gai had achieved reduced lustres in the manner of Maestro Giorgio, but that he had not fully mastered the technique, whereas this really had been done at Gubbio, where similar discoveries were made at a slightly later date. Thus when Gai sold his receipts to Wedgwood's in 1862 he may have parted with 'secrets' which he did not entirely understand. Perhaps this is why he could not explain to the English factory how to make them work.

In 1865 Bertozzini returned to Pesaro to oversee the factory of Castelbarco-Albani. Here he and his children, who were also talented ceramic painters, worked together on art-pieces derived from Renaissance models, concentrating on scenic subjects surrounded by grotesques and other ornament. They were much influenced by the great collection of Urbino and Casteldurante ceramics of the mid-sixteenth century presented to the Civic Museum of Pesaro in 1857 by the Cavaliere Domenico Mazza. The influence must have been overwhelming, and it precluded any new way of thinking of *maiolica*. The family exhibited fifty lustre pieces at the Industrial Exhibition in Milan in 1881, together with a vase two metres high painted with a battle scene, and they won a gold medal. In spite of this success the firm collapsed in 1885 after the death of the proprietor. In 1882 Terenzio's youngest son, Giovanni, went to work in Florence at the Cantagalli factory, started in 1878, taking with him details of the family's methods of lustre. Within a few years Cantagalli had become well known for show-pieces, including lustre, as well as for their regular production of revived designs in *maiolica*.

Meanwhile, at Gubbio the first sustained production of revival lustres was led by Giovanni Spinaci, from 1872, and Giuseppe Magni from about 1880. They received considerable acclaim for historically inspired art-pieces with a pronounced nineteenth-century sentiment. Their studios remained active until the 1920s, when the effects of the First World War and the derivative nature of their work led to the collapse of the market for show-piece ceramics of this kind. Reduced lustre was again made at Gubbio by Polidoro Benedetti from about 1935 to 1944, but has not been produced since. The current commercial production of so-called 'Gubbio lustre' employs resinate pigments fired in oxidation and the ruby-red is like weak fruit-juice compared with the reduced reds of the past.

The silvery-yellow lustre of Deruta aroused less interest than the ruby-red, and there

²¹ See C. W. Parmelee, *Ceramic Glazes*, Chicago 1951, p. 293.

²² G. Polidori, 'La Ceramica a Pesaro', *Emporium*, Dec. 1934, p. 340.

²³ F. Spadini, 'Cenni Storici', in *Storie delle fabbriche di maioliche metaurensi*, by Giuliano Vanzolini, Pesaro 1879, pp. 356–7.

the process of rediscovery did not begin until about 1870. It was undertaken at the factory of Salvatore Grazia, then head of the celebrated family who have been making pottery at Deruta since before 1500. For the Grazia the revival was not simply a regained technique but a revival of part of their family history. Their partial success is recorded in a report of 1872,²⁴ but it did not lead to any regular production until about 1895. At that time the Derutese enthusiast, Alpinolo Magnini, began an active promotion of the revived Deruta convention, in which the work of the Grazia family and of Magnini himself took pride of place.²⁵ Again, the market petered out in the aftermath of the First World War, and production was discontinued. In 1980 Ubaldo Grazia, the present head of the firm, began a series of trials which may well lead to its reappearance.

Paolo Rubboli of Pesaro established a studio for the manufacture of show-piece lustres at Gualdo Tadino in 1873, where with the aid of assistant painters he produced worthy copies and derivations from *cinquecento* lustres until his death in 1900. The blue *maiolica* painting was usually done by the assistants and he himself prepared and painted and fired the lustre. The studio still continues on a modest scale under his descendants. It is probably the only one of the lustre-revival workshops to have survived both world wars. All the lustre is reduced with wood, and a reduced pigment based on dissolved gold has been added to the traditional silver and copper-red lustres.

Inevitably 'revival' tends to be superficial; its aim is to imitate the appearance of what are considered the masterpieces of the past, but the impulses and discoveries which were originally expressed in them are not in fact being relived. Nothing is new twice over. There is a world of expectation, uncertainty and discovery in even a small piece of new work which is not touched upon in the revival industry. In the words of Dottoressa Biscontini Ugolini, 'the return to these objectives, without the impulse of real discovery, stripped the *maiolicari* of the late nineteenth century of every vital impulse. Usually it led only to a limp imitation and humdrum repetition in response to the market's requirements'.²⁶

Were these artists weak in that they accepted a state of affairs which their successors would have spurned? They would have had to be exceptionally resolute not to do so. The whole climate of the times was behind their revivalist virtuosity, and they themselves were part of it.

That climate, especially in Italy, was determined partly by feelings of national and regional identity, acutely felt during the decades following the Risorgimento: a longing to resurrect the essentially Italian—or Pesarese, or Umbrian—heritage which had been moribund in the previous century.

²⁴ 'Rapporto fatto dalla Commissione esaminatrice delle maioliche alla prima esposizione industriale di Deruta', 17 Nov. 1872, Perugia 1872, p. 5. In character with the taste of the day, the report shows more interest in the attempts to make ruby-red than in the beautiful iridescent silvery-yellow which was Deruta's main tradition.

²⁵ See plates in *Maioliche umbre*, as above.

²⁶ 'La Maiolica a Pesaro', in *Arte e Immagine tra ottocento e novecento, Pesaro e Provincia*, Pesaro 1980, p. 309.

In florid beauty groves and fields appear,
Man seems the only growth that dwindles here.²⁷

The desire was spurred on by the discovery that Renaissance ceramics now commanded remarkably high prices and that, as the originals became scarce, reproductions could be sold for sums which astonished the poor artists. English, French and Russian collectors, especially, bought up a high proportion of the available fine examples of *cinquecento* lustre before it was generally prized in Italy. As a result, there are more examples today outside the country than in Italy, and the Commune of Gubbio itself possesses very few. By the 1860s lustre was in short supply. Almost all Italian *maiolica* revivalists, therefore, made reproductions or close imitations of fine old pieces, and some made deliberate forgeries.

The revival was also based on the assumption of the half-truth that progress in art is achieved by study of the great works of the past. All over Europe museum collections were being formed to provide artists and designers with models which were supposed to inspire them to new and greater achievements. Of course, a great deal could be learned from these collections, but the creative process does not operate in such an apparently logical manner. The 'lessons' of the arts of the past can only be deeply assimilated through a fresh appetite, a new impulse, which extracts from them essential attributes far more profound than their mere appearance. Such creative impulses may even seem to be heading in quite other directions.

In the absence of such impulses there arise only imitations of appearances, and this is all the more likely when, as in the late nineteenth century, the demand for 'art' had divorced ceramics from any kind of living use or ceremony, and the work of the 'artist' had become separated from the technical processes of manufacture. The one *maiolicaro* whom Dottoressa Ugolini expressly excepts from her criticism was Ferruccio Mengaroni (1875–1925), whose exuberance made him react against all the art-factories who sought to employ him, and who in 1908 started completely afresh, single-handed, in his house in Pesaro, building his own kiln, throwing his own forms, and preparing all his own glazes, uniting in himself the separate aspects of making, designing and imagining.

The comparable attempt to bring together the two poles of the art and the craft of ceramics has been made by many others of Mengaroni's generation and later, in all countries of the Western world. Through them the revival of ceramic techniques, including lustre, gradually changed direction. The desire to copy the work of the past began to die away, and was replaced by a response to past achievements as sources of inspiration in the most general sense rather than as objects to imitate. Above all, people now realised that close physical experience of the behaviour of materials was an essential part of their work, and they began to think with the material itself and receive ideas from it, instead of simply using the materials to give form to a design which had already been planned.

Even so, as Mengaroni and others discovered, the results may still remain either historical

²⁷ Goldsmith, *The Traveller*, 1764.

revivals or ephemeral art-objects, unless the whole endeavour is made fruitful by personal interaction between the maker and his patrons, their needs, their dreams and even their payments.

Despite the all-round technical involvement of Bertozzini, Mengaroni, Rubboli and others, they still thought in terms of the Renaissance lustres (Colour Plate XXVII). For most of the lustre-makers the past glory was represented by Maestro Giorgio and his ruby-red. Maestro Giorgio was supposed to have 'invented' lustre, although he almost certainly learnt it from Deruta. Curiously, Zsolnay in Hungary was one of the few nineteenth-century designers who drew upon the great Hispano-Moresque tradition, which was still little recognised except by a few collectors who were able to buy superb pieces for only a few pounds even in the 1870s and 80s.

In the 1880s an Islamic mood began to appear in lustre ware, possibly because the sinuous forms favoured by the art nouveau movements had an affinity with the arabesque and other Islamic conventions, but also as an expression of the Near-Eastern romanticism that entered European taste towards the end of the century. It was for the most part an exotic taste, comparable to the chinoiserie of the eighteenth century, rather than a direct influence.²⁸ It was an ingredient in some of William De Morgan's lustres, and it appears in some of Clément Massier's plant forms, floral 'damascened' patterns and especially in his blue, green, silver and gold colour schemes. It is seen in the Cantagalli art-pieces and the early lustre of Pietro Melandri of Faenza, with designs of swaying flowers, peacocks, gazelles and other suggestive motifs, and with a very different mood in the plant forms and geometric ornament of the lustre studio at Pilkington's Royal Lancastrian Pottery. It was more than a passing fashion: all of these people were responding to the same kind of inspiration that had periodically stirred the imagination of Islamic decorators themselves for the last nine hundred years. The Garden of Delights is universal: the fish in the moonlit pool, the peacock under the swaying cypresses, the glint of gold and the flashing of dark eyes in the perfumed dusk belong as much to the secrets of human sensibility as to any geographical region of the globe.

Spain

The great tradition of Hispano-Moresque lustre had reached its height in the first half of the fifteenth century and it passed the next three and a half centuries in a slow, unsteady decline, in which occasional splendid pieces interrupt the general descent to a crude provincial standard of work and design. It declined for so long that it lasted long enough for a revival to be attempted before it was actually dead. The report of the working methods current at Valencia in 1785, quoted on page 216, was made as a result of the personal interest of King Carlos III in the survival of the industry. In the same volume of manuscripts²⁹

²⁸ Seen in the paintings of Haag, for instance; in Fitzgerald's ever-popular *Omar Khayyam*, Oscar Wilde's *Salome*, and in the building of Leighton House, as well as in a great variety of designs in domestic furnishings, fabrics and book illustrations.

²⁹ British Museum, Egerton ms 507, folio 102 ff.

are two reports addressed to Count Floridablanca by his assistants, Iriarte and Vargas, who were instructed to encourage the redevelopment of the lustre industry. Riaño wrote in 1878:³⁰

The second report tells us that in the building of San Isidro el Real essays had been made to reproduce English wares, and also the lustre ware of Manises, with the idea of establishing inside or outside Madrid one important pottery factory for both products, under the protection of Floridablanca, who was very enthusiastic about the project. . . . The work was directed by Don Sebastian Schepers, the brother or son of Cayetano Schepers, who was the chief modeller at Buen Retiro when it was founded in 1759. The imitations of English earthenware did not succeed . . . but the attempts to reproduce the Manises ware were so successful that the judges declared it was the equal of what was made in that town. . . .

At the same time a studio for floral and decorative designs was established, for the embellishment of this ware, under the direction of Jorge Peshorn. . . . No labour was too much for Schepers: he himself made the bricks for the kiln, and he searched out and tested clays from a great many localities.

As so often happens, the grander the scheme the less the result. The new lustre factory appears to have been short-lived and no recognisable work survives from it. The Manises tradition was saved not by elevated attempts to refine it, but by the popular local market for its most humble products, traditional lustre-painted tiles, small domestic items and minor votary pieces for religious buildings. In any case, was the industry really as depressed as the King supposed? Jacquemart, admittedly not a reliable authority, wrote in 1869 that at the end of the eighteenth century thirty kilns were still working at Manises,³¹ and it is likely that some of these were lustre kilns, for Riaño, a reliable author writing nine years later, reported:

Pottery of a dark copper-coloured lustre is made at the present time at Manises, and the imitations and forgeries to be met with at the dealers' shops in Madrid are made in that locality.³²

Were they really forgeries, or did they merely become 'forgeries' because of the claims made for them by the dealers? The Castán family, for instance, made lustre at Manises for hundreds of years and were still doing so in the late nineteenth century. The tradition virtually died because it became economically too weak to risk any undertaking which did not promise a prompt return. It survived by imitating its own past. By the 1870s the proprietors of small manufactories realised, like their Italian counterparts, that some money could be made by copying old designs. These were translated into a relatively crude coppery-

³⁰ Don Juan F. Riaño, *Sobre la manera de fabricar la antigua Loza dorada de Manises*, Madrid 1878, pp. 5-18.

³¹ A. Jacquemart, *Les Merveilles de la Céramique*, Paris 1869, p. 245.

³² Riaño, op. cit., English translation, London 1890, p. 153.

gold. The effect was attractive nonetheless; a reliable market developed for the work, and it perpetuated employment.

The firm Escoffet y Fortuny was formed in the 1870s in response to this market, much as the Cantagalli factory came into being in Florence, and several smaller businesses were started. One of these, the Ros family's pottery at Benicalap, on the outskirts of Valencia, still fires reduced-pigment lustre today, with considerable expertise, but produces mostly copies of old designs.

There is a fundamental difference of attitude between a living tradition and a revival. Living traditions can repeat popular designs and make use of their own past without inhibiting new ideas. In the fifteenth and sixteenth centuries this was continually happening at Manises. The old and the new were part of the same pattern of life, and no self-conscious distinction was made between them. A revival industry should in theory be able to generate new work, since it has the technical ability to do so, but it is prevented by its habits of mind.

This characteristic of the human mind, rather than any necessity, brought about a division between those who worked from past models and modern potters, who thought in a completely different manner. In Spain, as in many countries, the middle way tended to be too difficult to maintain.

Although Llorens Artigas published instructions for reduced lustre firings in his *Formulario*,³³ he appears never to have followed up the possibilities of reduced-lustre pigments. Potters of other nations have been inspired by Spanish lustre, but despite appreciation of lustre by the Spanish people generally, contemporary Spanish potters seem to be unexcited by it.

William De Morgan

De Morgan worked almost continuously with reduced pigment lustres from the start of his career in ceramics in 1872 until he gave it up to become a writer nearly thirty years later. He first became aware of the possibilities of lustre by observing the iridescence which sometimes developed from stains of silver nitrate fired on stained glass. Although he could have learned something of the lustre technique from others, he worked out his methods entirely on his own and became an acknowledged authority. His lecture to the Society of Arts in 1892 is a review of the history and technique of pigment lustres and incorporates a great deal of his own hard-won experience. It is not really comprehensive for, though De Morgan was a compulsive experimenter, he also directed an active workshop employing several assistants who had to be paid. Like the family business potters of an earlier age, he restricted his trials to methods for which he saw immediate practical applications.

His elaborately designed tiles and pottery in lustre and so-called 'Persian Faience' have always been sought after by collectors but are usually disliked by potters. This is not strange,

³³ J. Llorens Artigas, *Formulario y Prácticas de Cerámica*, Barcelona 1947, pp. 418–27, including many pigment receipts.

for De Morgan was not much interested in the pots themselves; they were simply forms for which he made designs. As a designer of stained-glass he was accustomed to drawing everything in detail before the practical work was begun and when he turned to pottery he still made a distinction between the 'creative' work of preparing a design and the artisan work of painting it. He seldom, if ever, made or painted pots himself.

This shows in the work of his studio. The designs are imaginative, yet even at its most fanciful, the painting is formal and contrived. The warmth of the maker's touch is missing.

De Morgan's designs belong firmly within the Italian figurative-decorative tradition, but they have far more originality than appears at first glance. He had a flair for working within a well-known field and going beyond all his sources of inspiration. Considering how much he knew about the Spanish and Italian lustre of the past, it is remarkable how little he referred to it in his own designs. As designer and as technician he insisted on working things out for himself and he had no interest in the methods then being used by others:

In '72 (or '70) I rediscovered the lost art of Moorish or Gubbio lustres. It had been discovered before in Italy in 1856—but that I didn't know at the time. . . . It has been re-discovered since, times out of number.³⁴

De Morgan was indeed able to produce a magnificent ruby-red lustre like that of Gubbio, though he was never as consistently successful as Maestro Giorgio (Colour Plate XXVIII). His special strength was the controlled use of varied concentrations of pigment to produce different tones of lustre. This is occasionally found in early Gubbio work. De Morgan redeveloped the idea and refined it, probably not knowing of its earlier use. It enabled him to combine line-drawing and colour-mass more effectively than anything even the Italians had done. He could place a dominant figure on the form of a vessel and, at the same time, introduce rhythmic line and detail within the overall composition. Varied tones of colour often appear also in his lustre tiles, where their special importance lay in mellowing a design which might otherwise have been too severe on the plain flat surface.

In the last twelve years of his work with lustre, De Morgan became less interested in dramatic reds and more sensitive to the poetic overtones of silver-yellow lustre in combination with grounds of green and blue, and much of his best work in lustre belongs to this range of colour (Colour Plate XXIX). In the late 1890s he also occasionally used resin lustres with coloured grounds, as in the late 'moonlight and sunset suite' bowls,³⁵ painted by Charles Passenger. His later work in these colours is more lyrical, more convinced than his earlier pieces with their self-consciously flamboyant designs.

What De Morgan did could not have been done in any other way, and perhaps not in any other setting than his oddly-managed workshops. No other studio—Wedgwood, Min-

³⁴ See also his similar remarks in his lecture 'Lustre Ware' to the Society of Arts on 31 May 1892. C. Gaunt and M. D. E. Clayton-Stamm, *William De Morgan*, London 1971, p. 162.

³⁵ Gaunt and Clayton-Stamm, *op. cit.*, pls. 132–5.

ton, Maw or Pilkington—could equal his brave use of colour or his unity of design in which every detail, on every scale, had an essential place.

The level of technique De Morgan achieved in much of his lustre conceals the enormous amount of groundwork he did on pigments and glazes and on methods of firing. Much of this work is invisible in that it came to nothing and was abandoned, sometimes after years of experiment. One such attempt was De Morgan's belief that the range of lustre pigments could be extended beyond the usual compounds of silver and copper.³⁶ He was certainly right, but had eventually to give up the quest without achieving anything.

Vilmos Zsolnay

Zsolnay appears to have had no connection with anyone else making lustre, but he developed a variant of the technique at his factory-workshop at Pécs in Hungary.³⁷ He was a man of astonishing energy and ability, and had a flair for inspiring his team of assistants and promoting their products. Unlike De Morgan, Zsolnay participated in the manual work of the factory and became a skilled ceramic painter as well as designing most of the products.

He began his career as a merchant, but the course of his life was changed when he took charge of his brother's unsuccessful artisan pottery in 1865. First he developed a range of tableware, architectural ceramics and glazed pipes, and revived the finances of the establishment. He became increasingly enthralled by ceramics, almost to the point of obsession. From 1873 onwards he concentrated on individual art-pieces, on which he himself worked, together with his daughters Julia and Teresa, and his son-in-law, Tadé Sikorsky. Most of the pots were porcelain decorated with underglaze, enamels, and gilding, inspired by a succession of enthusiasms for works of the past: Renaissance ewers, Palissy ware, the 'Roman Style', the Old Hungarian style, and Byzantine, ancient Greek, and Egyptian pottery, Isnik ware and Chinese enamels.

He was sure sooner or later to embark on lustre, and in 1883 he and his daughter, Julia, began a series of pots in the Hispano-Moresque manner, although he had not yet mastered the technique of reduced lustre. By 1893, after a long series of experiments with the help of the chemist, Professor Vincent Wartha, Zsolnay is said to have 'cracked the trade secrets of the Middle Ages' by developing iridescent lustres which he named *cozin* or 'sunrise' colours.

He had not really rediscovered any medieval secrets. He had ingeniously used the newly developed technique of reduced alkaline glazes to achieve lustre effects similar to those of the old Hispano-Moresque tradition. Since he wished to make lustre over hard porcelain glazes, he could not use the traditional earthenware technique. Instead, he applied the special glazes to the surface of already-fired porcelains and reduced them as they cooled. They

³⁶ Lecture, 'Lustre Ware', Gaunt and Clayton-Stamm, op. cit., p. 165.

³⁷ The city's German name is Fünfkirchen ('five churches'). Zsolnay used it as an emblem to mark his pots.

are best described as reduced enamels.³⁸ They made a sensation at the Budapest Exhibition in 1896 and at the Vienna Exhibition of 1900.

Like most of his contemporaries, Zsolnay worked primarily from the inspiration of works of the past, which were at that period being gathered into public collections all over Europe, supposedly as an example to modern artists and designers. But he was far too inventive to rest content with earlier models. Colour and ornament enthralled him and he was an acute observer of the materials themselves. He did not think of lustre only as a surface decoration, but experimented with new forms and textures to display and vary its qualities to fullest effect (Plate 101). He investigated different ways of applying the *cozin* glazes and developed powerful themes in the art nouveau and *Sezession* manners, with effects of marbling and veining. He also designed intricate patterns resembling damascened steel, which were probably the first lustre designs to be acid-etched. In association with the avant-garde architect, Ödön Lechner, he designed iridescent lustre stove-tiles and architectural ceramics.

After his death in 1900, the factory was administered by his heirs, but without his guiding imagination and creative restraint its products became gaudy and superficial. In the absence of strong ideas, his successors relied too much on sensational technical effects. As has so often been shown by traditions in their decline, technique itself is arid unless it is directed by clear concepts and emotional conviction.

The factory at Pécs still exists under State administration, but though the products are superbly made from a technical point of view, the founder's inspiration has not been regained.



101. Bottle-vase, 23.5 cm high: decorated in iridescent reduced-glaze lustres. Vilmos Zsolnay, Pécs, Hungary. About 1896. City Museum and Art Gallery, Stoke-on-Trent.

³⁸ Zsolnay's solution appears to have been curiously like the experiments started by Thomas Bentley in 1772, but never followed up (see page 156).

Clément Massier

Like his contemporaries, De Morgan and Zsolnay, Massier dreamed in lustre, and could not leave it alone. Though his work, like theirs, has the stamp of late nineteenth-century expectations for art-pieces and is, therefore, far removed from the ideals of potters today, it was a direct expression of his own ideas and technical discoveries, and was in no sense revivalist like the work then being done in Italy. All three men probably benefited from the absence of any national tradition of lustre in their own countries, and were relatively free of historicism as a result.

Massier's work has a pronounced art nouveau character and often incorporates painted designs based on swirling, sinuous plant-forms, occasionally human and animal figures, and intricate patterns suggestive of damascened steel. He worked on clear glazes, opaque tin-glaze, and coloured glazes, and used pigment lustres and reduced-glaze lustres and fuming effects, sometimes all on the same piece. He worked out his techniques for himself, and the effects he obtained are special because his pigments and firing methods were not quite the same as any used elsewhere.

He was born in 1844 into a pottery family at Vallauris, and he started as a maker of traditional utensils for the table and the kitchen. As a result of a journey to Italy in 1870, he realised that there was little future in artisan production, whereas there was a good opening for show-pieces and for large-scale ceramics for gardens and interiors. He established a studio at Golfe-Juan, easily accessible from the fashionable resorts of the French Riviera, and soon became very prosperous. Seeing the commercial possibilities of special pieces in lustre, he travelled to Valencia in 1885 and gained a basic idea of the technique, from which he devised his own experiments, taking a very different path from any then being followed in Spain. He won the grand prix at the Exposition Universelle, Paris, in 1888.

At the height of his career Massier employed about fifty artisans for regular production work. Though he seems to have been drawn to lustre by his acute business sense, it fascinated him and he used the profits of the rest of the business to subsidise experiments which were not always profitable. Whereas the urns, jardinières, large vases and life-size turquoise turtles were reproduced in quantity by his employees, the lustres were treated as unique pieces. He obtained a vast variety of effects and continually experimented with new ideas, new glazes, pigments, firing effects and methods of application. One ingenious technique was to apply a second glaze containing silver or copper to an already glazed pot, and to fire it in a normal oxidised atmosphere; a design was etched with hydrofluoric acid into the overglaze and the piece was refired at low temperature and heavily reduced as it cooled. Eventually he worked more with reduced glazes than with reduced-pigment lustres, as did Zsolnay in Hungary.

Two of Massier's assistants, Jacques Sicard and Henri Gellie, worked under a five-year contract at the Weller Pottery, Zainsville, Ohio, from 1902. They produced large and small ornamental pottery forms, many of which were intricately decorated with plant motifs on

superimposed, iridescent reduced glazes, typical of Massier's style. The lustres had considerable success and were exhibited at Tiffany's in New York, but the potters took pains to keep their methods secret and returned to Golfe-Juan in 1907, apparently having given nothing away.³⁹

Massier's gifts as an artist-potter were supported by his early training as an artisan, and the best of his work is appropriately housed in the Museum of Vallauris. The lustre production of his studio was brought to an end by the First World War.⁴⁰

Pilkington's Royal Lancastrian Pottery, 1891–1938

The recent past can seem more alien than centuries long gone by. Potters of the late twentieth century can feel closer to the medieval workshops of Spain or the Middle East, perhaps because so little is really known about them, than to the European art-pottery movement of the turn of the century.

The Pilkington brothers' art-pottery company was formed in 1891 under the management of the chemist, William Burton (1863–1941), formerly of Wedgwood's, and his brother Joseph, supported by a studio of technicians, skilled artisans and artist-designers, amongst whom were Walter Crane, Lewis F. Day and Gordon Forsyth.⁴¹ The first years were devoted to the development of the art-pottery with opalescent and aventurine glazes on artist-designed thrown and moulded shapes. William Burton began to apply himself to lustre in 1903 and full production of reduced-pigment lustres was under way by 1906. The work was an outstanding international success; it was exhibited in Milan in 1906, where it was awarded the Grand Prix, and at Brussels in 1910. Agencies were opened in Nice, Hyères, Florence, Rome and Naples, the same areas that were already acquainted with lustre from the Doccia and Cantagalli revivalist factories in Florence, and from the Umbrian studio factories and from Clément Massier at Golfe-Juan.

Though the production continued until 1938 the main impulse did not survive the First World War. William Burton retired, Walter Crane died, and Gordon Forsyth and several other members of the studio left to join the armed forces. After the war, the work was for the most part a perpetuation of already established themes, and in Burton's absence little lustre was made. Gordon Forsyth returned for a single year and then left to take charge of the Stoke-on-Trent School of Art, and to work as an independent designer.⁴² He had an enormous influence on the Staffordshire industry and many of his designs for lustre

³⁹ I am grateful to Robin Hopper for this information, and for showing me examples of their work.

⁴⁰ I am obliged to M. Henri Mauro of Golfe-Juan, grandson of Clément Massier, for his kindness in providing information about the atelier and for showing me the lustre ware that remains in the family.

⁴¹ Charles and Edward Pilkington owned collieries near Manchester and were proprietors of the large and famous glass-factory at St Helen's, Lancashire. These notes are indebted to the excellent catalogue of the Exhibition of Royal Lancastrian Pottery held at the Manchester City Art Galleries in March 1982, compiled by Deborah Clarke and Richard Gray.

⁴² Gordon Forsyth's book, *The Art and Craft of the Potter*, London 1934, expresses some of his strongly held views on design.

were produced in liquid golds and platinum in the factory of A. E. Gray. These are for the most part a semi-industrial extension of the ideas he had already developed under William Burton.

Burton delivered a lecture on the technique of lustre to the Society of Arts in 1907, at the time of the Studio's greatest success. This lecture marks the high point of the systematic study of the technique of the reduced-pigment lustres. Burton was an able chemist and he was able to bring together a considerable amount of technical research done in England, France and Germany in the preceding decades. Most of his lecture was printed in the Society's journal.

Royal Lancastrian lustre fully represented the design-spirit of the period. Shapes of simple but delicately articulated profile were used, a studied reaction against the fussy relief-ornament of the neo-Renaissance art-ware of the late nineteenth-century. The shapes provided the greatest scope for glaze effects, painted designs and lustre sheens (Plate 102). The designs themselves, all painted by hand, expressed the spirit of *art nouveau*, full of controlled sinuous movement with dramatic interplay of positive and negative space; they were exemplary in their balance of dominant forms and subsidiary detail, admirable in their exploitation of the texture and colour of original glazes, and the telling use of striking polychrome pigments and iridescent lustres. The range of lustres was probably the widest ever to be used within a single studio, including bold flat reds and golds, flecked greens and satin-surfaced silvers, nacreous yellows and opal-greys, and mysterious ruby-reds which Maestro Giorgio himself could have envied.

The designs incorporated many boldly-drawn figurative themes, abstract patterns and ornament evolved from plant forms, flowers and fruit, all carefully worked out before being painted on the ware. They were not revivalist, like so much of the contemporary work in Spain and Italy; the designers had no desire or need to copy; indeed, they were dedicated



102. Shallow bowl, about 11 cm wide, painted by C. E. Cundall, mainly golden reduced-pigment lustre, with blue and yellow. Pilkington's Royal Lancastrian Pottery, Clifton Junction, near Manchester, early 20th century. City Museum and Art Gallery, Stoke-on-Trent.

to giving new form to the universal principles that they discerned within the supreme designs of every age. Behind their productions lay a great deal of thought and discussion, such as is represented in the writings of Lewis Day,⁴³ in the later teaching of Gordon Forsyth, and in older classics such as Owen Jones' *Grammar of Ornament* of 1868, which all the members of the studio knew well.

Rarely, if ever, can a ceramic studio have been so richly endowed with intelligence or enjoyed such continuity of effort. Under the successive leadership of Lewis Day and Gordon Forsyth, with the talent and experience of William Mycock, Gwladys Rogers, Annie Burton, Richard Joyce and Charles Cundall, all working as distinct individuals, yet united in their aims, the studio's success is no surprise. The Pilkington brothers achieved what no one else had managed: they brought together a close-knit team of highly productive specialists, with an unrivalled command of a difficult technique, enterprising design-skills and perceptive manual expertise, all supported by Burton's exuberant ability to promote sales and exhibitions. Just as the graphic designers were spurred on by the sense of insight into a fundamental language of form and ornament, so the technical designers, William Burton and his works chemist, Abraham Lomax, felt they were learning to co-operate with the fundamental principles governing glazes and colours.⁴⁴

And yet the studio's work conveys an overwhelming historicism, a claustrophobic triumph of the Principles of Design over the mysteries of living forms and rhythms. The poetry of light and colour seems to have got lost in the chemist's laboratory. Somehow, without being aware of it, and certainly without intending it, this exemplary team allowed the one vital pulse that really mattered to escape them. There can be more spirit in one small piece of apprentice-work from old Manises than in a collector's piece from Royal Lancastrian.

Thus this splendid enterprise represents the end of an era, an era whose material assurance was swept away by the Second World War. Until then potters had believed that the future lay in greater command of the materials and techniques, a fuller understanding of the principles of design, and that the way led steadily forward towards some achievable, ultimate perfection. However, the work of Royal Lancastrian, and of others during the same period, proved to be no more absolute than any other, and the accumulation of technical knowledge did not result in pottery and ceramics of ever-ascending quality.

It is unwise to disdain the experience of the past, yet it may become necessary to do so in order to come face to face with the present. Lustre-potters of the later twentieth century have thrown away a great deal of inherited knowledge, not so much by decision as by neglect, by insisting on making their own rediscoveries in their own expensive and sometimes painful way, by following their own intuition, however misguided, rather than the examples of the distant or recent past.

Lewis Day, who was in some ways prophetically out of tune with his time, would have understood this apparent waywardness. He was well aware that too much knowledge can

⁴³ Especially *Nature and Ornament*, London 1909.

⁴⁴ See Abraham Lomax, *Royal Lancastrian Pottery*, published by the author, 1957, especially his chapter 8, pp. 76-85, 'Iridescent Lustre Pottery', which condenses his theory and practical experience.

divorce artists from their intuitions, and that no amount of training can make up for the loss.⁴³

To what extent can any creative potter claim to make use of the principles of design, or to apply the knowledge of ceramic chemistry? Beyond a certain point such knowledge becomes restrictive. There is simply too much of it. It upsets the working balance between forethought and impulse. Even if it could all be assimilated, it still does not offer access to the ageless process by which an inner conviction imparts a kind of life to a material object. The real secrets of lustre are hidden not in chemical records or firing schedules, nor in any universal principles of design, but in the maker's own life.

⁴³ See his *Nature and Ornament*, London 1909, vol. II, p. 229. As he wrote elsewhere, the lustre lion cannot be merely 'a zoological specimen dyed red'. Both passages are referred to in the catalogue of the Royal Lancastrian Pottery Exhibition in Manchester, 1982.

10

POST-REVIVAL

From the beginnings until the last years of the nineteenth century the varieties of the lustre technique form a more or less consistent sequence. Each centre developed and practised fairly definite methods and did not make radical variations. The workshop-studios of De Morgan and the Royal Lancastrian Pottery in England, the Cantagalli workshop in Florence, like the older lustre-makers of Fostat, Valencia and Deruta, all deliberately specialised in a restricted range of the possible techniques.

Thus, up to this point, it has been possible to give some account of the tradition of reduced-pigment lustres as distinct from resinate lustres prepared from the noble metals, and to distinguish both from reduced-glaze lustres.

By the late nineteenth century lustre-makers were becoming less consistent in their methods—Zsolnay and Massier, for example, started with reduced-pigment lustres and then became more interested in reduced-glaze lustres, and sometimes used both together. Towards the end of his pottery career, De Morgan occasionally used noble-metal resinates (liquid gold and platinum) in combination with some of his customary techniques. From this time onwards those few potters who produced any lustre at all became increasingly eclectic in their choice of techniques.

The change began because of the use of high-fired clays and glazes—glazes which do not soften at low temperature and are therefore unsuitable for the traditional methods of reduced-pigment lustres (see page 198). Zsolnay, however, discovered that he could obtain a lustre effect by painting the fired ware with glazes containing copper, silver or bismuth, firing them to their fusion point, and reducing them as they cooled. The French ceramicist, Louis Franchet, developed a similar method quite independently and was convinced that it could achieve as much as the older pigment-lustres and more, with a good deal less trouble.¹ Reduced glazes do not in fact look quite the same as reduced-pigment lustres; the effect is less subtle, less mellow and, if they are examined under strong magnification, the surface is seen to be quite different. However, they can give a wider range of colours and are often more brilliant, sometimes excessively so.

Some factories were already in the 1880s using lustrous reduced glazes as an overall surface covering. The availability of small gas-fired kilns by the late nineteenth century enabled

¹ L. Franchet, 'Étude sur les dépôts métalliques obtenus sur les émaux et sur les verres', *Annales de Chimie et de Physique*, 8e série, IX, Paris 1906.

artist-potters to pursue this technique much more easily than could have been done with the larger traditional kilns fired with coal or wood. Zsolnay and Franchet were unusual in that they saw the possibilities of reduced glazes for painted decoration.

Reduced lustrés came to be used quite extensively from about 1890 to 1930 and relatively few people, such as Herman Kähler of Naestved, Denmark and Bernard Moore in Staffordshire, persisted with the more demanding reduced-pigment technique. Amongst those who used reduced-glaze lustrés most notably were the Linthorpe Pottery and the Ruskin Pottery in England, who started about a decade before Zsolnay; Maximilian von Heiden and his sons at Schöngau, Bavaria; Doulton's of Lambeth, Bernard Moore, and Sir Edmund Elton in England; Margit Kovács of Hungary and Pietro Melandri and Ricardo Gatti of Faenza. These are only a few out of many, for the technique was generally very popular with artist-potters. Interest in reduced-glaze lustrés has recently revived and they are at present used by Alan Barrett-Danes in England and Marjorie Clinton in Scotland, and by Jean-Paul Van Lith in France, amongst others.

Technically, reduced-glaze lustrés are akin to pigment lustrés in that they depend on the reduction of metallic compounds, but the general effect is much denser since the lustre is usually not set off against a contrasting glazed ground.

It is not difficult to make a reduced-glaze with a lustrous surface, but it is difficult to make a really good one. One temptation is to sensationalise them, like the *cozzin* glazes which were misused at Pécs after Zsolnay's death. Their astonishing iridescence, set off by ever-changing depths of streaky colour, was intriguing at first glance, but had no after-interest: the play of natural effects was not deepened by any human intention. They were yet another example of the futility of technique without meaning. The opposite extreme is equally familiar—a heavy, sombre glaze, usually the result of excessive reduction, especially when the glaze covers a light-coloured clay. For really good reduced-glaze lustrés the colour of the underlying clay is very important; so also is the depth of colour which results from the percentage of metal compounds in the glaze, the glaze thickness and the texture of the surface. Some of the lustre glazes of Ricardo Gatti of Faenza are magically rich and luminous and have an absorbing emotional impact because they were restrained by fine judgement, much as a good trumpeter controls the blast of his powerful musical instrument.

The purpose of reduced-lustre glazes, as used originally by Zsolnay, Massier and Franchet, was to obtain effects similar to the old lustrés but on more refractory glazes. The other variants of lustre which have been followed up in the present century are more than technical alternatives: they arise from an altogether different appraisal of lustre. Traditionally it was supposed to be a clear metallic film, sometimes iridescent, lying upon a glazed ground that was usually white, but sometimes coloured. It contrasted clearly with the glaze beneath, and the firing was meant to develop the lustre without affecting the glaze. When tin glazes were used, prolonged reduction could make the glaze surface slightly grey. Sometimes this is seen on most kinds of old lustre and was considered a defect. In recent times it has been deliberately cultivated (Colour Plate XXXe).

Carefully controlled, the alteration of the glaze can lead to a changed relation between

the lustre and its background, in which the two play together, so to speak, and come to meet each other. In reduction the glaze can develop areas of variegated soft flecked grey or blue-grey or pink, which are sometimes speckled or have a scale-like appearance. This is really the effect of reduction on the bubbles and craters formed by the glaze in the process of settling when it was originally fired. The thicker the glaze and the higher the temperature at which reduction takes place, the more the glaze will be altered. In extreme cases it can become a lustrous bluish-black.

This reappraisal of lustre effects is simply one aspect of a general change in ceramic attitudes which sees qualities of body, glaze and surface-decoration as parts of a single unified object, conceived as a whole, rather than as distinct features. In the past the defined image or painted design was expected to stand out clearly from the ground. Today the two aspects modify each other and are frequently inseparable.

This change of attitude is partly a reaction to the severe clarity often cultivated in industrial production, and also to the prevalence of commonplace brightly coloured and shiny things in the modern world, but it goes deeper. It is an expression of the readiness of the mind to respond to a mysterious or ambiguous image, to be more aroused by an evocative suggestion than by a definite statement, and it has occurred in the fine arts and in creative writing as much as in applied arts such as ceramics. In the past people were accustomed to distinct images with specific meanings; often the mind was not awakened because no further 'imagination' was needed.

Thus in the field of lustre a change in technical methods has followed from a change in aesthetic attitude. The appetite for effects in which clay-body, glaze and lustre are merged has led lustre-makers to fire at higher temperatures, to develop different pigments, and to work for 'transitional', or semi-lustrous, effects in addition to the defined colours hallowed by tradition.

There are many other kinds of transitional glaze effects in addition to the alteration of pigment and glaze by reduction. Glazes can also be fumed by smoke, or impregnated by metallic vapour. Depending on the setting of the ware and the circulation of the draught, the vapouring may be general or localised, and the glaze may be lightly haloed or dramatically flashed with colour. At the higher range of lustre temperature the metal in certain pigments may migrate almost completely from the painted area and leave a flashed deposit all around it, producing a kind of lustre-negative (Colour Plate XXXd). Again, some of the clay carrier in the pigment may adhere to the glaze, making a slightly matt semi-lustrous surface. In themselves such effects are neither desirable nor undesirable; they have to be observed and learnt from before they can become useful, but they are just as much a part of the language of ceramics as the distinct lustre-finish of time past.

Recognition of the possibilities of transitional effects has opened the way to other variants of the customary techniques. Some of these are hardly lustre at all in the ordinary sense, though they are all partially lustrous, and most of them usually occur side by side with stronger, traditional lustre. Some of them arise not from any thin film of reduced metal, but from metallic particles in the glaze itself, as with the famous *sang-de-bœuf* reds, or in a slip, or in a pigment already fired into the glaze.

Mention should be made of two men, especially, who have worked and experimented with lustre and its transitional effects for many years, and passed on their experience to numbers of students.

Working at Fustat on the same land as the potters of Fatimid times, Saïd Es-Sadr has followed up a combination of reduced-pigment lustre, reduced-glaze lustre and etching with hydrofluoric acid.² By reducing a soda-copper turquoise glaze so that the copper becomes golden-red, then masking certain areas with a resist and removing the exposed surface with acid, he has achieved remarkable combinations of copper-gold and turquoise-green. In reduction only the upper surface of the glaze becomes red, so that a light etching reveals the body of the turquoise glaze beneath. Es-Sadr has also worked persistently with activated lustres over black and other dark glazes, reducing the lustre at low temperatures, sometimes even below red heat. The work is supported in the kiln by a metal frame so that it is fully exposed to the reducing gases. Es-Sadr has used freely-drawn human and animal figures and figurative themes extensively on his lustred pottery (Colour Plate XXXr). The flow of the pigment over the impervious glaze resembles that of ink or gouache colours and invites free drawing with brush or pen and, once it is dry, the pigment can be incised or scraped with wooden tools—possibilities which had long been ignored until Es-Sadr reopened them, drawing upon his skill as a painter and his knowledge of Arabic calligraphy.³

Working in Sydney and Canberra, Alan Peascod has achieved some success with reduced-pigment lustres on stoneware and porcelain, an idea attempted and soon abandoned by William Burton at the Royal Lancasterian Pottery early in the century. His work in this field is discussed on page 201.⁴ The project is important not only because the use of a harder material permits more delicate forms than the traditional earthenwares. Peascod has explored many variations of lustre, but his other main concern has been the development of lustre from 'dry glazes'. These are fusible slips which develop coloured and lustrous surfaces when fired in reduction. He has tried many metallic compounds in addition to silver and copper, incorporated in slips of varying composition. Their colour changes dramatically with even slight variations in the thickness of the covering, and is accompanied by changes of texture from cratered, crystalline surfaces to others which are smooth and semi-matt. He has always kept the different aspects of his research closely together and has used both the 'dry-glaze' and the high-temperature lustres in combination with reduced-pigments, noble-metal lustres and acid-etching. He has also developed large, vigorously thrown non-functional forms, many of which are extensions of traditional Islamic vessels (Colour Plates XXXc and XXXI).

Lustrous sheens can be obtained also by fuming ceramics with metallic chlorides and other compounds, a method similar to those used by glass-workers. This is a version of the vapouring effects which can occur locally in the hotter parts of a kiln during an ordinary

² The acid dissolves glass readily and is highly dangerous as a liquid and as a vapour. A concentration of 10% is sufficient.

³ Sahir al-Awani, *The Artist Saïd es-Sadr*, Cairo 1979 (in Arabic).

⁴ See also his article 'High Temperature Glaze Lustre Firing', *Pottery in Australia*, vol. 20, no. 1, 1981, pp. 27-9.

lustre firing. Overall vapouring, barely controllable, can also be obtained by introducing metallic salts into the kiln through the heat inlets or by placing them in containers in various positions in the chamber.

A variety of lustre can be produced by applying a blow-torch to still-hot ceramics as they emerge from the kiln and selectively reducing parts of their surface. This method has occasionally been used by Graham Oldroyd in Australia (Colour Plate XXXg). The risks are obvious and the effects uncertain. A gentler version of the same principle has long existed as a variant of *raku* firing, in which the glowing pots from the kiln are cooled in a combustible material such as sawdust, leading to the random reduction of glaze and pigment.

In reduction-firing many pigments and enamels develop semi-lustrous surfaces, usually with an alteration of the glaze or slip which accompanies them. Such changes often come about as a by-product of the development of more orthodox reduced lustres. These effects are being deliberately developed by several potters at the present time, most notably by Jean-Paul Van Lith of Biot in the South of France (Plate 105).

The noble-metal liquid golds and platinum can give a much more extensive range of effects than that obtained by the normal industrial application (Plate 104). Thinly applied, smudged, or scraped or deliberately highly-fired, a remarkable range of golds, greys, pinks and amber colours are obtained, and some unusual textures.

A lustrous effect very similar to low-temperature reduced-silver lustre can be obtained from in-glaze iron pigments on felspathic stoneware glazes fired with some degree of reduction, an effect which used to be greeted gleefully by Michael Cardew when it came about in his kiln at Wenford: 'We can make lustre here too,' he said, 'and without even trying!'

All these observations refer to definite materials and distinct methods by which semi-lustrous surfaces can be made. All of them invite variation through the actual manipulation of the material. Pigments can be conventionally painted or applied exceptionally thickly or thinly, sprayed, stamped, poured, dabbed, stencilled, masked, cross-hatched, abraded or wiped away with the hand or textured materials. All these methods will come out differently and they can all give interesting results. Ultimately, however, there is no virtue in variation for its own sake. The value of a technique depends on what is done with it, and that depends on the insight of the person who uses it (Colour Plate XXXII).

Few, if any, of these technical variations are entirely new. They were not invented in the twentieth century. They came into use partly because it has now become relatively easy to buy or build small kilns fired with gas or oil for semi-experimental work, and to buy almost any ceramic chemicals one could wish. But they also reflect the changing social conditions in which pottery has been made since the industrial revolution.

Until the mid-nineteenth century most European factories and workshops were based on the scale of a family business. The smaller enterprises usually comprised five or six people. Only the makers of the simplest wares could afford to have less because of the need to obtain and prepare materials, and fire the kilns in addition to making the ware. The largest establishments seldom included more than about a hundred people because



103. Jar, 12 cm high: lustre on tin-glazed earthenware, by Herman Kähler of Næstved, Denmark, between 1920 and 1930. Silver lid by Elise Thomsen. *Kunstindustrimuseet, Copenhagen*. See page 184



104. Dark stoneware bowl, 34.5 cm wide: with resinate lustres over the glaze. A revaluation of the possibilities of liquid gold and platinum, far removed from the traditional gilt-edged teacup, the metallic sheen being enhanced by the heavily textured clay surrounding it. Lynn and John Wheelodon, 1982. *City Museum and Art Gallery, Stoke-on-Trent*. See page 181



105. Three jars, 29.5 cm high. The left-hand jar is stoneware with reduced iron slips and burnished matt liquid-gold. The others are wood-fired lithium tin-glaze with burnished gold and fuming effects. Jean-Paul Van Lith. Biot, 1982. See page 181

of the need to coordinate the various processes, which were still based on manual skills even though the production was increased by machinery. By the late nineteenth century, however, the units of production were tending to become either larger or smaller. The family-based factory-workshop such as those of Manises and Deruta was no longer the natural size; some survived but most of them gave up or went bankrupt. The scale of the workshop and the market's requirement for a consistent product led them to develop methods that needed only a limited range of materials, and which could be learned and passed on. Factory-workshops of this kind could not easily pursue experimental techniques without becoming unmanageable.

Clément Massier, who experimented extensively with lustre while managing a workshop of several dozens of artisans, distinguished clearly between this branch of his work and the relatively restricted range of techniques used for the main output. His lustre methods were too demanding, too intuitive, to be passed on. A similar distinction was made at Pilkington's Royal Lancastrian Pottery.

In the small studio of the independent potter or ceramic artist many varieties of method could be used by the owner, alone or with one or two assistants. The experience was retained

in one single head and there was no necessity for consistent production. The work, if successful, could command a high enough price to cover experimental risks and a degree of wastage which would have been unacceptable to the traditional small business.⁵ In such a setting, many experimental or variable techniques which would have been a liability in earlier times became positively desirable, not only in lustre but in every variety of ceramic material. Instead of treading a well-worn path, many people preferred to find their own way and, if necessary, to rediscover old methods afresh in their own manner. This is why De Morgan commented that lustre had been rediscovered again and again 'times out of number'. He exaggerated, but it is true that by the time he made this remark some potters had 'rediscovered' lustre for themselves with the aid of technical books. Several short descriptions of the lustre process were published in the 1880s. They enabled those who had no connection with any working tradition to make their own beginning. The Danish potter, Herman Kähler of Naestved, began making brush-painted reduced-pigment lustres in about 1888 (Plate 103), with no other help than a summary of the technique in a German technical manual.⁶

Thus the variable techniques and transitional effects, most of which the potters of the past knew but usually tried to avoid, acquired a new value. Technically they became easily accessible; aesthetically they became desirable; and socially it became possible, even profitable, for a potter to employ them in a studio-workshop. Though this reappraisal could bring a spurious glamour to casual ideas simply because the effects are unfamiliar, this seldom happens. The technique of lustre is too demanding to appeal to those who simply want an easy, arresting effect. It is difficult and usually expensive to get any effect at all in reduced lustre and it does not happen without perseverance.⁷ Lustre-makers of the past tried as far as possible to exclude the variables: modern potters try as far as possible to use them and to understand their causes. Their path is not any easier on that account.

Lustre easily invites exaggeration. This happened with some of the lustred *istoriato* wares of the *cinquecento*; it happened with some of the later Spanish lustres, with some of De Morgan's show-pieces, with Zsolnay's *ezin* glazes, and it occurs with some of the functional and non-functional work of the present day. The temptation to concentrate on visual effect at the expense of form, texture, balance and content has been ever present. It is especially strong in the present century, with the development of non-functional work in ceramics in general, with its concentration on optical rather than tactile effects. Unless lustres take their place as part of an integrated, whole object, satisfying to other senses and to the mind as well as to the eye, their virtues are lost and their appeal is short-lived.

The predominant characteristics of lustre ware, old or new, in daily use or for ceremony, purposeful or non-functional, are colour and movement and light. What matters is what these mean to people: the technical methods are means to an end, not in themselves important.

⁵ Piccolpasso wrote in *The Three Books of the Potter's Art* that even at Gubbio 'oft times of 100 pieces of ware tried in the fire, scarce six are good' (op. cit., vol. II, p. 90).

⁶ I am indebted for this information to his grandson, the potter Herman Kähler of Viomose, Denmark.

⁷ See, for instance, the frank personal account by Sutton Taylor, *Lustreware*, Leeds Art Gallery, 1980.

The sensation of light, its meaning and its associations, belongs to all lustre, old or new, light or dark, clear or mysterious. According to the nature of the mind that perceives them, these lustres are as full or empty of meaning as the dawn or the moon or the dusk, sunlight over water, the glow of embers in a fire, the shine on a metal wheel, the snatch of light on a wire, the moon half-hidden by clouds or the iridescence hidden in a sea shell. A great many things are still not understood about the lustre technique even after a thousand years. Very much less is understood about the appeal of lustre to the human mind and senses. The technical mysteries can to some extent be solved; the others are part of our very being. They can be explored but never explained.

11

ALCHEMY AND SYMBOL

Early lustre-makers worked with materials similar to those used by the alchemists who tried to create gold. Lustre was golden and it seemed to be a kind of gold. We know today that it was not chemically gold. What did they think it was? Since it was such a thin film, the ordinary tests of assay, melting and surface-trials could not be applied to it. Even the variation in colour would not show what it was, for alchemists and artisans both recognised various kinds of gold and believed that there existed many 'incomplete' forms of the precious metal.¹ Even today, how many people remember that their wedding-ring is partly copper?

The modern child knows that gold cannot be made from lead, silver, copper or iron or any other base metals. But few who learn this as a fact at school could explain the reason why. It is an accepted piece of information based on the assumption (actually incorrect) that the elements are unchangeable.

Until the eighteenth century people were taught that gold could indeed be made from these base metals. Again, few people could explain how or why; it was simply accepted information. Most people regarded the Emperor Ferdinand III as enviable rather than crazy when in 1647 he witnessed the alchemical transmutation of lead into gold and had coins struck from the precious metal to celebrate the event. Gustavus Adolphus, King of Sweden, the great general of the Thirty Years War, also witnessed a transmutation and commemorated it in a similar way.² Modern chemical knowledge shows that these rulers must have been deceived, but the chemical theory current in the seventeenth century, and in the previous two thousand years, seemed only to confirm that what they believed they had seen did actually happen.

Alchemical theory was expressed in many varying ways and included wide differences of opinion. Certain principles were quite generally accepted, however, and since alchemical practice may have a bearing on lustre-making and the valuation of lustre by its patrons, it is not out of place here to indicate some of the alchemists' basic assumptions.

The alchemical theory inherited by Islam and later by Christendom was based upon ideas first put into writing by Aristotle. According to this theory, primal, unformed matter

received during the process of creation the impression of the four fundamental elements, fire, air, water and earth, and all substances were made from different combinations of these four elements. Every substance was developed by nature according to a particular 'form' or 'field' which governed the proportions of the elements in it and therefore determined its properties.³ A substance could be destroyed by removing its specific form or field, and reconstituted in accord with the specific form of another. The idea of alchemical transmutation is based upon this concept, which appears to be confirmed by the analogy of growth and decay in organic life.

All the metals were thought to be closely related and to have been brought into being by differing proportions of two 'exhalations' enclosed deep within the earth's body, and described by Aristotle in the *Meteorologica*.⁴ Most later alchemists interpreted these exhalations as breaths, or vapours, identifying the 'dry vapour' with sulphur and the 'moist vapour' with mercury. All metals were therefore believed to be generated from sulphur and mercury, a theory which was still being used as a framework of thought by Newton himself at the end of the seventeenth century.⁵ If a metal such as lead or copper were made to lose its form and thus to 'die', the proportions of mercury and sulphur could be adjusted, and the substance might be regenerated in a new form. Given the right proportions and the right conditions, the new form could be that of gold. Alchemists had many theories and secrets about those necessary proportions and conditions. Attempting to follow them up, they covered an enormous field of experiment, sometimes highly intelligent, sometimes weird, for which they have been described by a scientist as Fathers, not of Science, but of Laboratory Technique.⁶

The complexities of alchemical theory and experiment are far too extensive to consider here in any detail, but this general outline is enough to indicate how closely alchemical work must at times have come to some of the preparations of the lustre-masters, for they too worked upon base metals and achieved a seeming gold. The normal practice until recent times was to start with metallic silver, copper and sometimes lead and tin, and break down their 'form' by heating them with sulphur. To the black crust thus formed they usually added mercury in the form of cinnabar, and also ferruginous earths; they worked it all together into a fine paste, and eventually made from it a glazed surface which shone like gold.

To the alchemists' physical theory of the generation of metals the Gnostic philosophers added the spiritual theory of the outward radiation of the universal creative Spirit, the One, into forms and manifestations at various levels, from the purest, most spiritual 'Intelligence' through an ordered hierarchy of phenomena to the most base, from the invisible and intangible to the most dense and chaotic. Both Muslim and Christian alchemists held that cor-

¹ Asserted, for instance, by Jabir ibn Hayyan, the father of Islamic alchemy, and accepted by most alchemists after him.

² Allison Coudert, *Alchemy: The Philosopher's Stone*, London 1980, pp. 199-200. Also, E. J. Holmyard, *Alchemy*, London 1957, pp. 123-31, where several other sensational claims are described.

³ Coudert, op. cit., p. 19.

⁴ Book III, ch. 6 (378c).

⁵ D. Castillejo, *The Expanding Force in Newton's Cosmos*, Madrid 1981, p. 109, quoted from Newton's correspondence.

⁶ F. Sherwood Taylor, *The Alchemists*, London 1951, p. 3.

respondences existed between the various levels of manifestation, and that all occurrences were governed by universal principles whose effects differed on different levels, though the essential nature of the process was the same. Hence, the refining or reconstitution of a physical substance had a counterpart in the refining of the inner, spiritual life of man. Both processes represented a part of a universal movement of return to the One, the original source of creation: both were instances of creation's urge towards reabsorption in the Divine. Many medieval alchemists believed that the metallurgical aspect could only be achieved if it were accompanied by a spiritual dissolution and rebirth.

Sometimes the physical aspect, and sometimes the spiritual, was emphasised. By the time classical alchemical theory reached Islam and Christendom the two aspects had become inseparable. Aristotelian philosophy had considered mostly the physical approach. The Gnostic philosophers who flourished before and for several centuries after the birth of Christ were chiefly concerned with the spiritual side. Islamic philosophy inherited both through Greek texts which were translated for the caliphs of Baghdad by Nestorian Christian refugees from the eighth century AD onwards. Both sides are interwoven in the alchemical works attributed to Jabir ibn Hayyan (c.721–813 AD), many of which are now believed to have been written by members of a group of Shi'ite mystics in the ninth and tenth centuries. These and other Islamic alchemical treatises became known to Christians of the West through the Arab universities of Córdoba and Toledo. The first alchemical work translated from Arabic into Latin was the *Book of the Composition of Alchemy*, completed in 1144.⁷

Alchemical tradition regarded the metals as being alive; they had been generated, they could 'die' and they could be reborn, and their life was intimately connected with the Seven Planets. The Seven Planets were manifestations on a high level of the One supreme source of creation. They were intelligences transmitting influences from higher to lower levels in the great scheme of the worlds, and they also assisted in the process of spiritual return to the source. The seven metals known to the ancient world were regarded as the signs, or manifestations, of the planetary intelligences on earth.

Lead	♄	Saturn
Iron	♂	Mars
Copper	♀	Venus
Mercury	☿	Mercury
Tin	♃	Jupiter
Silver	☾	Moon
Gold	☼	Sun

Thus, when alchemists worked with these metals they believed that they were not simply dealing with natural substances which were in various ways useful to mankind, but were

⁷ These notes constitute the briefest summary. They are drawn principally from Seyed Hossain Nasr, *Science and Civilization in Islam*, Cambridge, Mass. 1968, especially the chapter on alchemical tradition; and also from P. Sherwood Taylor, op. cit., Allison Coudert, op. cit., and E. J. Holmyard, *Alchemy*, London 1957.

also becoming involved in universal processes whose significance transcended the physical world, and were all aspects of the divine creative force, with which all creation longed to be reunited.

When they could afford the wages, many alchemists employed artisans to help with their experiments, and they benefited from the traditional methods which artisans had passed down from one to another, of which one example from a great many is given on page 218. Alchemists also discovered many things which in due course became useful to artisans. Their learning included a great deal of practical knowledge in addition to obscure speculation. The writings attributed to the father of Islamic alchemy Jabir ibn Hayyan, for instance, include the earliest known recipes for the preparation of nitric acid and the concentration of acetic acid by the distillation of vinegar, methods for making steel, refining metals, and for dyeing cloth and leather. The same is true of the later writer, Abu'l Qasim of Kashan. His *Treatise on Ceramics* (quoted on page 210) formed part of a large work which he described as 'a kind of alchemy', covering in practical terms the recognition and refinement of natural substances for metalwork, perfumes, dyestuffs, pigments, etc., as well as for glass and pottery, all useful for manufacturing, and all involving the conversion of material from one form into another.

Strange theories sometimes led to important practical discoveries. As late as 1670, for instance, gold-tin chloride, known as 'purple of Cassius', was synthesised in the course of alchemical experiments intended to lead to the creation of gold, and the mauve and purple enamels used on eighteenth-century tableware were a by-product of this discovery.⁸

As was mentioned in the first chapter, the earliest polychrome lustres, made in or near Baghdad in the early ninth century, had no precedent in ceramic tradition. The range of colours and reflections obtained by the reduction of alloys of silver and copper on white glaze remained unmatched until modern chemical knowledge was applied to lustre about a thousand years later. Was it coincidence that the first translations of Greek alchemical texts were being made in Baghdad at about the same time? What were the lustre-makers really trying to do? Were they trying to make lustre, or new colours, or gold? The question may never be answered but it is important. Certainly attempts to make gold covered a range of operations remarkably similar to those involved in the making of lustre.

Many alchemists, for instance, believed that the Philosopher's Stone—the supreme essence of gold which possessed the power to communicate its 'form' to base metals—should be generated from a mixture of silver, copper, lead, iron and tin. The alloy so constituted required to be leavened by 'male' sulphur and 'female' mercury, the two Aristotelian exhalations which were often termed 'the parents of the Stone'. The sulphides so formed would be readily reducible to metal, especially if ground and thinly dispersed, as on a ceramic glaze. In fact, they closely resemble Abu'l Qasim's lustre pigment, of which he said 'that which has been evenly fired reflects like red gold and shines like the light of the sun'.

⁸ Named after Andreas Cassius (died 1673), the Hamburg physician believed to have discovered it.

Artisans and alchemists had much to offer one another. However, artisans have always tended to be conservative in approach, for their bread depends on making things work. As Piccolpasso regretted in the preface to his celebrated *Three Books of the Potter's Art*, they keep to proven methods and do not have 'speculative minds'. The alchemists' attitude was by contrast highly speculative and experimental, and often ruinously expensive. The new discoveries which lay behind the early polychrome lustres required something of both approaches.

Since so little is known of early Islamic alchemy, it would be unwise to lay too much emphasis on any one aspect. Some of Jabir's investigations, however, were so relevant to lustre that the possibility of his practical influence on the early technique must be recognised, especially since he is believed to have lived for some years at Kufa, a city which archaeologists regard as one of the most probable sites for the manufacture of the early polychrome lustres. In one of his books, Jabir mentioned the blue or green flame produced from copper compounds. Elsewhere he described an illuminator's ink prepared from 'golden' marcasite, which Abu'l Qasim later referred to as a lustre material, as a substitute for real gold.⁹ Holmyard continues:

He mentions the uses of manganese dioxide in glass-making, and he knew how to concentrate acetic acid by the distillation of vinegar. In various places he describes in some detail such typical chemical operations as calcination, crystallisation, solution, sublimation and reduction, going beyond the average alchemist by attempting to understand the changes that occur in these processes.

Alchemists identified gold with the sun, and they used the same sign for both. Modern thought recognises that gold might be used to represent or symbolise the sun, but to the medieval mind the connection was more intimate; there was an essential affinity between them and they could not be entirely separated; gold participated in the sun's nature and it occupied the same hierarchical position in relation to the substances found on earth as the sun occupied amongst the heavenly bodies.

After this indication of the background of theory and manufacture from which the lustre technique emerged, it is now time to consider those for whom it was made.

As the historical chapters in this book have shown, early lustre was made mostly for rulers' courts and for people closely connected with them, at Baghdad, Samarra, Cairo and later in the kingdom of the Nasrids and in the Spanish Christian kingdoms. It was not one of the foremost luxuries of any court: a large number of other articles were made of gold or silver, or decorated with them. Vessels of cast or beaten metal, jewellery, weapons, woven silks and tapestries, all took far longer to make and were much more valuable. But lustre, too, had its sheen of golden light: it had the noble gleam which naturally suggested wealth and power. The connection with the court was also supported by a good deal of mental

symbolism. Gold was not only a sign of wealth, but also an emblem of endurance and stability. The symbolism was not consciously held in mind, any more than people today spend time thinking about a golden ring on their finger, but it established a valued custom with an important emotional content.

The association of Islamic rulers with the sun is clearly shown in the iconography of many works of art and craftsmanship, and especially in the inlaid decoration of metalwork, long before the same symbolism was applied to Queen Elizabeth I of England and to Louis XIV as *le roi soleil*.¹⁰ The supposition was that the ruler achieved, inherited or maintained his position with the aid of the heavenly powers, and should even be identified with them. Kings ruled on earth as the sun rules in the heavens. Success depended on so many imponderables, not least on the battlefield, that it demonstrated the support of Fate; it was written in the stars and maintained by the celestial order. Anyone connected with the ruler's court was thereby connected with a charmed circle which dominated the earth as the sun dominates the heaven. The court introduced its associates not only to opportunities of status and power in the worldly sense, but also to Fortune. Therefore, while the court received homage, it also radiated largesse. By gifts, people became connected with its favoured presence. This association could matter much more than the object itself.

Generosity was expected of the great. The sun-association of the ruler enhanced his greatness, but it also could be used to remind him of his proper role. Honorific symbolism and the use of superlative words in inscriptions, however genuine, could also be applied in expectation of a proper response. Blessings could work both ways.

The imagery on lustre ware conveyed aspects of the court circle. In the first figurative lustres of Iraq the subjects were musicians, warriors or auspicious animals. The early Fatimid lustre of Egypt was usually decorated with palmettes and half-abstract ornament based upon leaves and fruit, signifying growth, power and plenty. When figurative designs came into favour in the eleventh and twelfth centuries they almost always referred to the court circle: horsemen or huntsmen, musicians, entertainers, sun-faces, and beasts and birds of good omen.¹¹

In Persia lustre-masters contributed honour to the court by representing hunting scenes, scenes from historical epics such as the *Shah Nameh*, legends and poems, figures of the ruler seated in dignified ease (*diwan*), or groups of courtiers conversing or attending on their lord. In large dishes the general horizontal composition left lunette-shaped spaces at the top and bottom of the design. These were often filled in with sun-rays descending on the group from above and with a pool and fishes at their feet, suggesting the twin presences of the golden sun and the silvery moon. At least one such bowl includes the half-face of the sun looking down from the upper lunette upon the ruler and his attendants, and the

¹⁰ See J. W. Allan, *Islamic Metalwork in the Nuhad Es-Said Collection*, Sotheby, London 1982, especially items 4, 5 and 15. The author's commentary and his introduction elucidate the symbolism of gold, sun, light and goodness in many of these beautiful inlaid vessels. For sun-and-ruler symbolism see especially pp. 24-6.

¹¹ E. J. Grube, *Islamic Pottery*, pp. 140-1.

⁹ E. J. Holmyard, *op. cit.*, p. 79.

sun's rays falling upon them, as if it were dispensing largesse to them in the same manner as the court should do towards its subjects (Plate 41). A similar symbolism underlies the designs of the Nasrid kingdom in Spain, though since they were seldom figurative the symbolism can only be inferred from the cosmic emblems which were considered appropriate (Plate 58).

The ruler and the court were not identified with the sun in any immediately obvious way in the lustre of Christian Spain, but the sun-association was implicit, sensory rather than calculated. Some of the religious lustre of Manises, and later of Deruta and Gubbio, however, employed a deliberate symbolism in displaying the sacred monogram with rays spreading outwards from it (Plate 94). The Christian symbolism in this case was not really with the sun but with light itself, a religious association which is universal and is implanted in language itself, in words such as 'enlightenment' and 'illumination'. Though the symbolism has philosophical aspects¹² its main impact is through the senses, through the apparent power of 'dead' matter to shine and to seem to move, although it is still. This may explain why ecclesiastical builders in Spain frequently embellished sacred precincts with lustre tiles, even though many of the designs were Muslim symbols.¹³

The importance of light-symbolism may also explain the strange fact that in Persian religious buildings lustre tiles appear most often in tombs and mausoleums of the Shi'ite sect, which had contacts with Sufis, but they were not used in orthodox Sunni shrines. Some of the apparently secular images and inscriptions might seem out of place, but may have been interpreted allegorically, like the reflected light itself, by members of a brotherhood who made allegory and symbolism a spiritual language.¹⁴ The signs of Sufi influence on inlaid metalwork and on the poems inscribed on lustred and gilded bowls have already been mentioned (page 71).

The power of metallic reflections and colours to arouse intense religious emotion and intimations of the immanent divine presence is most clearly expressed in Christian tradition by the great Abbot Suger, builder of the new Abbey Church of St Denis in the early twelfth century. For him, as for the writer of the *Book of Revelation*, the brilliance of colour and precious materials were harbingers of spiritual revelation.

Suger had an intuitive understanding of all the arts and costly materials which he lavished upon his beloved abbey. His vivid account of the rebuilding is lit up by his passionate response to many beautiful materials, but especially to the lights and colours of jewels and precious metal, which could bring him to a state of religious ecstasy. The famous passage below is first and foremost a personal experience, but it is also a justification for the use of artistic skills and the richest materials for religious purposes.

¹² For instance, in the neo-Platonic teaching of the heavenly spheres, and in St Francis's *Canticle to Brother Sun*.

¹³ See page 109.

¹⁴ See Oliver Watson, *Persian Lustre Ware*, as above, where the subject is discussed in detail.

When — out of my delight in the beauty of the House of God — the loveliness of the many-coloured stones has called me away from external cares, and worthy meditation has induced me to reflect, transferring that which is material to that which is immaterial, on the diversity of sacred virtues: then it seems to me that I see myself dwelling, as it were, in some strange region of the universe which neither exists entirely in the slime of earth nor entirely in the purity of heaven; and that by the Grace of God I can be transported from this inferior to that higher world.¹⁵

One of the most revered of the abbey's possessions was a Greek manuscript of the mystical writings attributed to Dionysius the Areopagite. These had recently been translated into Latin by Johannes Scotus, and the commentary included formulations of the neo-Platonic theory of art and perception. Suger appears to have known the commentary almost by heart, and he really lived the experience. The short extract given here shows how deeply the symbolism of light was embedded in Christian theology:

The material lights, both those which are disposed by nature in the spaces of the heavens and those which are produced on earth by human artifice, are images of the Intelligible lights, and above all of the True Light itself.¹⁶

The extensive later use of lustre for religious purposes is foreseen in these two passages; they also acknowledge the metaphysical aspect of colour and reflected light in general. The theory includes the jewels and gold mosaics of Byzantine tradition, for example, as well as manuscript illuminations and the Western religious lustres which were to come.

This kind of experience and the spiritual, visual and verbal associations which follow from it, appear throughout Christian art and literature, from the mosaics of Ravenna and Santa Sophia to the imagery of popular hymns.

Christ, whose glory fills the skies,
Christ, the true, the only Light,
Sun of Righteousness, arise,
Triumph o'er the shades of night.¹⁷

Perhaps the deepest of all such experiences was that of Jacob Boehme, the German shoemaker of the early sixteenth century. Seeing the sun's light reflected from a copper vessel, he received a spiritual illumination which altered his entire life and brought into being some of the world's most profound mystical writings. His transformation was not caused by the reflected light, but the reflection touched it off. In him the spiritual side

¹⁵ *The Book of Suger, Abbot of St Denis, on what was done under his administration*, trans. E. Panofsky, Princeton 1946, cap. XXIII, pp. 63–5.

¹⁶ *Ibid.*, p. 24.

¹⁷ Charles Wesley, about 1750.

of alchemical tradition and the light-theology of religious tradition were fulfilled in a single overwhelming experience.

It is fruitless to try to distinguish the uncertain frontiers between spiritual and aesthetic experience. Some people deny that there is one, regarding all mystical experience as illusion. For others the two kinds of experience are inseparable. For most people, aesthetic experience is an intimation of a wider and spiritual understanding, and leads naturally into it. The symbolism of the half-light, the half-bright, becomes just as important as that of full light itself. Every designer knows that the impact of light or colour depends on what is put beside it; everyone knows that the light which shines out of the darkness can make a stronger impression even than the sun because it has been enhanced by the contrast. In poetry as in lustre, the half-light can convey as deep an impression as brightness:

Had I the heavens' embroidered cloths,
Enwrought with golden and silver light,
The blue and the dim and the dark cloths
Of night and light and half-light . . .

Yeats's dream happens to be a wonderful evocation of the quiet luminosity of medieval Syrian lustre on grey and blue grounds, of the mysterious reds over deep-blue glazes of Kirman, and of the cloudy effects of some transitional lustre being cultivated today (Colour Plate XXXIII). Though none of these lustres resemble gold, or were even meant to do so, they share with the golden lustres two attributes which give them a particular significance: this is the age-old association of life with light and movement. Lustre films seem to shine in their own right, and because the slightest change in the viewer's position alters their reflections, they seem to move. Their apparent ability to shine and to move has always fascinated both the mind and the senses. Anyone who has ever seen lustre ware being taken out of a kiln and has rubbed away the blackened ochre to reveal the film of shining metal underneath can easily understand how our forebears in a prechemical age believed that the metal hidden in the dull sludge of the pigment had somehow been reborn in the flame and smoke of the fire.

This experience approaches the mysterious frontier between sensation and symbol, the sensory and metaphysical. Today the arts and the applied arts of craftsmanship appeal for the most part to a public that is highly sceptical and literal-minded compared with medieval and Renaissance minds. Few people today would call lustre more 'noble' or 'alive' or 'divine' than other colours because it seems to shine and move. Yet the glow, the glimmer of iridescence, the glint which peeps through the strands of a brush-stroke, receive a closer aesthetic appraisal now than ever before.

The language of aesthetics has tended to replace the language of religion or metaphysics in general communication. People think differently and construe experience differently. Our sensory impressions relate less readily to organised ideas. Aesthetic effects are assimilated more intuitively than in the past and may even take the place formerly occupied by metaphysical belief. The maker's impulse, the hunch from which the work proceeds, may prove

to be vacant nonsense, but it may be original and genuine. It is not necessarily meaningless because it is intuitive. Jung's exploration of archetypal symbols has revealed a consensus of meaning behind mankind's use of forms and colours, even though the meaning can often not be put into words. Colour and light, especially, touch the so-called 'silent hemispheres' of the brain, whose language is not the same as that of words and concepts. These impressions lead into metaphysics, but not through the traditional door of conceptual thought.

It is beyond the scope of this chapter to attempt to describe the effects of lustre or, indeed, of any other aesthetic impressions upon the inner human world. In that realm sensation, memory, feelings and thoughts are mysteriously interwoven, forming a unique pattern within all individuals, and constituting a dynamic part of their life.

Our common conventions and phrases indicate how widely the impact of gold and silver and light extend into our inward associations. Why, for instance, are wedding anniversaries silver or golden? Why are wedding rings made of gold? We say people are 'fired' with enthusiasm; their eyes 'light up'; a body 'glows with health'; a person may 'radiate' happiness, or be a 'shining' example. We 'reflect' on matters of importance; we may have a 'glimmer of hope' or 'see the light'. We speak of a 'dark secret' and a 'bright future', and use many such half-rational expressions of shared experience and inner imagery.

Russell Hoban's strange book *Riddley Walker*, set in the distant future in the grotesque half-culture of a world desolated by nuclear disaster, contains a remarkable passage evoking a universal response to things that shine. The people collect pieces of old, incomprehensible machinery buried in the ground. In the strange language that survives, Riddley Walker describes a machine with a difference:

It wernt nothing like when you dig up old rottin machines out of the ground these wer in ther parper working place nor nothing rottin they wer some kynd of iron dint rot it wer all shyning all catching that shaky glimmer. Some of them ther shels ben broak open you cud see girt shyning weals like jynt mil stoans only smooov, Id all ways usit the word *shyning* same as any 1 else myt. The sun is shyning or the moon is shyning. Youwl see a shyning on the water or a womans hair. When you talk of the Littl Shyning Man its jus the middl word of what hes callt ther aint no real meaning to it. Suddn when I seen the shyning of them broaking machines I begun to get some idear of the Littl Man. Tears begun streaming down my face and my froat akit.¹⁸

Why did his tears run and his throat ache? What does the gleam of metal do to people? If it awakens the desire to possess, what is it that people wish to possess—the gold or silver or steel, or the source of light that makes them shine? Or is it the light that comes from them, the living light that can never be captured, whether it reflects from metal or moonlit water or the eyes of a loved one? Or is it some light within themselves, awakened by the

¹⁸ Russell Hoban, *Riddley Walker*, Pan Books, London 1982, p. 96.

glint which strikes the eye, which they hope to repossess by possessing the token that touched it off? It is inside and outside, and cannot be partitioned.

Yeats knew it well, and his poems are studded with images of starlight and water, blood, gold and glimmer and, like lustre, have an elusive clarity:

Though I am old with wandering
Through hollow lands and hilly lands,
I will find out where she is gone,
And kiss her lips and take her hands;
And walk among long dappled grass,
And pluck till time and times are done
The silver apples of the moon,
The golden apples of the sun.¹⁹

12

THE TECHNIQUE OF
REDUCED-PIGMENT LUSTRE

Though lustred pottery has been known for at least a thousand years it has always been regarded as mysterious. The mystery has at times been fostered by deliberate secrecy and the fear of commercial rivalry. Piccolpasso, writing of Italian lustre in 1558, said 'many make them (the lustre kilns) on the floors of houses which are locked and under close guard, for they look on the manner of making the kiln as an important secret and say that in this consists the whole art.'¹

Lustre has also been considered mysterious because it is difficult to make. A small difference in temperature, or variations in the thickness of the pigment, can make one piece a prime exhibit and another a waster. Again, Piccolpasso spoke for all lustre-makers: 'It must be known that these (kilns) are always made small . . . and this comes about because the art is treacherous, for oft times of 100 pieces of ware tried in the fire, scarce six are good.'² Although a considerable amount of information is now available, the theory is not completely understood and the practice remains uncertain because of the number of variables.³

This chapter is an attempt to bring together as much as possible of the background information. It starts with an outline of the basic technique, which applies to all reduced-pigment lustres from the earliest times until today. Since no written records exist for the first four hundred years, there is a risk of interpreting ceramics of the past in terms of techniques current today. Ceramic effects depend on unchanging principles, however, and though working methods vary, the fundamentals are the same from age to age. Extracts from early practical methods are quoted. Modern variations of traditional methods have already been summarised on pages 178-9.

Chapter 14 consists of a series of questions and answers exploring lustre effects and processes from a scientific point of view. References to some of these answers are given in the present chapter.

¹ *The Three Books of the Potter's Art*, as above, vol. II, p. 89.

² *Ibid.*, p. 90.

³ Gold ruby glass is an interesting parallel. It was expertly made in Roman times; the technology became systematic during the eighteenth century and the theoretical basis became known during the nineteenth and twentieth, but even now the effects are often unpredictable because of the number of variable factors; see Susan Frank, 'Gold Ruby Glass', *Glass Technology*, vol. 25, no. 1, 1984.

¹⁹ Last stanza of *The Song of the Wandering Aengus*.

Outline of the Basic Technique

Reduced-pigment lustres are produced by applying pigments consisting of compounds of silver and copper mixed with clay or ochre to the surface of an already-fired glaze. The object is refired to a temperature at which the glaze begins to soften. Then by starving the atmosphere of oxygen and causing a reducing atmosphere in the chamber of the kiln, the metallic compounds are broken down and become deposited as a thin metallic film on the surface of the glaze, but if the temperature has been rightly judged the clay or ochre does not adhere to the glaze. When the object is cool the surface is rubbed to remove the darkened crust of clay and the lustre shines with a metallic sheen, red, orange, yellow, amber, silvery, sometimes with iridescence of green, blue, or purple. Many colours and textures can occur, depending on the composition of the pigment, the intensity and duration of the reduction, and the length of the cooling period.

The composition of the pigments is important but it is less critical than the choice of the glaze and the recognition of the ideal firing temperature. Glazes are therefore considered first, followed by notes on the preparation of pigments, and by comments on the firing.

GLAZES

Two eminent ceramic chemists, Louis Franchet and William Burton, wrote in the early years of this century that lustre can be produced on any kind of glaze. It is only necessary, they said, to fire a glaze to its softening point, and then to reduce the pigments. In theory these remarks are probably correct, but in practice they are hard to put into effect. Even to determine the ideal softening-point of a glaze is considerably more difficult than it sounds. Even when this temperature is known, the input of heat into a kiln has to be held back before it is reached. Rising heat has a certain momentum, like a boat moving through water, and it cannot be stopped. In the critical range the temperature needs to be held steady, neither rising nor falling for perhaps as much as an hour, while the pigments undergo reduction. This again is less easy than it sounds. If the glaze has not softened sufficiently, the lustrous film of reduced metal cannot adhere to it. If it has softened too much, the metallic film and the clay medium both become fused into it, and only a dull brownish stain will be seen.

Therefore most lustre-makers, having worked out a satisfactory firing schedule with known glazes, have chosen to keep to them, and have avoided experimenting beyond this range, although good results might in time be achieved. In practice, however, lustre develops more readily on certain types of glaze than on others.

Most lustre wares now in existence have been made with fusible glazes with a high alkali content, and there are good reasons for this. In the first place, silver and copper form metallic sheens most easily on glazes containing sodium and potassium because the molecular structure of the glaze permits their atoms to enter into the structural network (see Question

9, page 226). Secondly, the sodium-potassium-oxygen bond is too strong to be broken down by the carbon monoxide in the kiln atmosphere during reduction. Glazes rich in these alkalis, therefore, are unaffected by the intense reduction that converts the pigments to metal, whereas lead glazes are easily reduced and can become darkened (see Question 29, page 234). Thirdly, alkaline glazes soften at very low temperatures, which is of some advantage for lustre-making. Finely divided silver and copper are partially volatile even at low red heat and become more volatile as the heat increases. Thus the lower the firing temperature, the less metal is lost. The metal remains where the pigment was applied and does not become diffused as a vapour. There is also a practical reason for the long-continued traditional use of fusible alkaline glazes. They begin to soften at around red heat, that is between about 600 and 620°C, a temperature that can be recognised by eye. Before the invention of temperature-recording equipment this was extremely important.

The opaque tin-glazes used for much of the lustre ware of Iraq, Egypt and Persia, and later of Spain and Italy were less different from the early alkaline glazes than they look. They were really alkaline glazes with an addition of lead-tin oxide, which whitened them without lessening their fusibility. Like the clear alkaline glazes, they softened at around red heat. Visually, their advantage was that the opaque white ground revealed the colour of the lustre more brilliantly. Practically, their disadvantage was that if they became too hot the lead and especially the tin could be partially reduced, becoming grey (see Question 29, page 234).

Clear alkaline glazes similar to those of early Islamic tradition can easily be prepared today. The following recipe would be a close equivalent:

Alkaline frit	85
Flint	10
Kaolin	5

Such a composition would craze severely on any clays normally in use today, because in cooling it would contract more than the clay it adheres to. The problem was familiar to Islamic potters in the past, and their traditional technology partially solved it. Whereas natural clays were used for unglazed pottery, glazed ware was usually made from a blend of about 10% white plastic clay, 80% powdered quartz, and 10% of the alkaline frit used in the glaze.⁴ The frit made this 'siliceous paste' harden at about 940°C, and the alkalis and the quartz made it contract as it cooled. The glaze was under compression because it contracted less than the clay-paste that it covered, and the defect of crazing was lessened, if not always completely avoided.⁵

In Egypt, Spain and Italy the tin-glazed pottery used for lustre was made from natural

⁴ See Chapter 5, pages 57 and 73.

⁵ See Allan, Llewellyn, and Schweitzer, 'The History of So-called Egyptian Faience in Islamic Persia', *Archaeometry*, 15, 2, 1973, p. 169.

light-coloured clays with a high lime content, as described by Piccolpasso.⁶ The fine particles of calcium carbonate in the clay made it contract as it cooled, so that here again the glaze was under compression and crazing was often, if not always, overcome. The high calcium content of samples of such clays is shown in the table of analyses on page 236.

Siliceous pastes and high-lime clays are seldom used today, and therefore the alkaline glazes once traditionally used by lustre-potters are now virtually obsolete. However, glazes that are serviceable on ordinary clays can be prepared today by substituting relatively craze-resistant oxides for some of the sodium and potassium, and by increasing the silica content. General comments on the composition of such glazes are given on page 201, and compositions that have been actually used for lustre are listed on pages 202–3. Clear, coloured and opaque versions of these glazes can all be satisfactory.

These modified glazes do not soften at such a low temperature as the traditional alkaline compositions. Therefore the critical point in the lustre-firing, at which reduction begins, no longer occurs at red heat but at about forty degrees beyond it. The exact point has to be determined for each glaze. Modern temperature-recording equipment makes this temperature more acceptable than it would have been in the past, when temperature had to be told by eye.

Until the later nineteenth century it was assumed that lustre could only be achieved on highly fusible glazes. Since then, the range of harder glazes capable in the right conditions of promoting lustres, has been steadily extended. Pietro Gai of Pesaro, Théodore Deck of Sèvres, and most of the revivalists, assumed that reduction must occur at around red heat, that is, at about 620°C. William De Morgan, Vilmos Zsolnay, and William Burton of the Royal Lancastrian Pottery appear to have used glazes that softened at about 650–660°C. Recently, Alan Peacock in Canberra found that harder glazes can also be used, requiring the reduction to occur at about 700°C. Still more recently, Sutton Taylor has reduced lustre as high as 750°C.⁷

Is there an upper limit to the temperature at which reduction can take place? Such a limit seems to be imposed by the volatility of silver and copper. Their volatility increases with temperature, and in the finely divided form in which they occur in lustre pigments they become volatile much earlier than they would melt in their solid form. Thus the harder the glaze and the higher the consequent reduction temperature, the greater the proportion of metal lost by volatilisation.

The upper temperature limit has not been definitely established. It is largely a matter of theoretical interest, and potters who live by their work take pains to avoid reaching it. It is not a definite temperature, since it depends on the degree of vapourisation that is considered acceptable, but it seems likely to occur around 800°C (see Question 31, page 235). For practical purposes, therefore, glazes for reduced-pigment lustres need to soften by or below about 750°C.

⁶ Op. cit., vol. II, pp. 15–16.

⁷ Both articles are listed on page 220.

Most earthenware glazes maturing below 1000°C begin to soften well before 750°C, but most of them craze on normal clays. Many harder glazes, maturing between 1000 and 1150°C, soften at or below 750°C. Few higher-fired glazes do so. The challenge of formulating a sound glaze with a low softening-point involves a study of the complex subject of eutectics, which is too extensive to consider in detail here. However, some rule-of-thumb suggestions can usefully be proposed, though they are no substitute for the formulations which can be made with the help of a specialised manual.⁸

1. The ratio of basic oxides to silica should be between 1:1.5 and 1:2.5. With less silica, crazing is likely; with more silica the softening temperature is likely to be too high.
2. The ratio of alumina to silica should be about 1:10. Higher proportions of alumina will make the glaze less fusible.
3. Some soda or potash is desirable amongst the basic oxides.
4. Some lead is almost essential, since it assists fusibility but does not promote crazing. However, glazes rich in lead can easily darken during reduction, especially if tin is also included.
5. The greater the variety of the basic oxides, the more fusible a glaze becomes.
6. Certain materials increase fusibility without increasing the likelihood of crazing, such as compounds of zinc, barium, lithium and strontium, and small proportions of them are therefore useful.
7. A proportion of up to 15% of a borax frit is usually beneficial. It increases fusibility and hardens the glaze surface but in this amount it does not increase the risk of crazing.
8. The more finely a glaze is ground and screened, the more fusible it becomes.
9. About 1% of bentonite or 3% of kaolin help the fritted materials to remain in suspension in water.
10. Alkaline frits often dribble or 'curtain' when pottery is dipped in them. An addition of up to about 4% of the liquid volume of the glaze as vinegar usually solves the problem.

Fusible glazes do not necessarily have to be fired at low temperatures. Some can be fired in the high earthenware range 1100–1200°C. Lustres will develop on them just as well as if they had been fired normally.

Stoneware glazes with unusually low softening-points can be made by making the alumina content very low and the soda-potash content abnormally high. Such glazes craze easily, but on matured stoneware crazing is not such a serious defect as on earthenware. It is possible, though difficult, to obtain strong-red lustre on glazes of this kind, but golden, amber and silvery glazes are achieved fairly easily. High-fired glazes for lustre are a fairly recent development and they may eventually supersede the traditional earthenware compositions.⁹

⁸ See the section 'Eutectic Mixture' in F. Hamer, *The Potter's Dictionary of Materials and Techniques*, London 1975, p. 114; also David Green, *Understanding Pottery Glazes*, London 1963, especially Tables 4, 5 and 6 on pp. 94–101, and the same author's more detailed *Handbook of Pottery Glazes*, London 1978.

⁹ A. Peacock, 'High Temperature Glaze Lustre Firing', *Pottery in Australia*, vol. 20, 1981, no. 1, pp. 27–9.

This is all the more likely in view of the possibilities of fluxed pigments, discussed on pages 205-6.

Finally, fusible glazes can be fired on clays which have already been matured in a hard bisque-firing. This is not a certain way of avoiding crazing but it is often effective. Italian *maiolica* has for centuries been fired in this manner, and the method is normal in industrial manufacture.

Glaze recipes

1. A fusible alkaline glaze.

Alkaline frit	90
China clay	10
Tin oxide (optional)	10
This resembles traditional Islamic alkaline glazes. It produces a brilliant lustre from both copper and silver but it crazes easily and requires a clay body with a high contraction (see page 190). Fires 950-1020°C. Lustre reduction about 625°C.	

2. A fusible lead-alkali-tin glaze from Piccolpasso.

Marzacotto (potash frit)	12
Sand	12
Lead-tin ash	10
Approximate formula:	
0.35 K ₂ O	2.25 SiO ₂
0.65 PbO	0.40 SnO ₂
Requires a traditional high-calcium <i>maiolica</i> clay with high contraction in cooling (see page 200). Fires 960°C. Lustre reduction about 625°C.	

3. A fusible lead-alkali-tin glaze mentioned by Gréber, *Traité de Céramique*, Paris 1934, p. 459.

Litharge	35
Sand	45
Sea-salt	10
Tin oxide (optional)	6-12
This is a traditional French faience glaze requiring a faience clay with high calcium content (see page 200). It requires fritting. Fires about 960°C. Lustre reduction about 625°C.	

4. A glaze used by Massier at Golfe-Juan about 1900.

Felspar	7
Quartz	33
Décize sand	19
Potassium carbonate	6
Sodium carbonate	5
Red lead	25
This composition requires fritting. Massier fired this glaze at 990°C and used it for lustre reduction 625-650°C. It was sometimes coloured with metal oxides and was also used opacified with tin oxide.	

5. A lead-alkali-tin glaze used over red clay at Aldermaston Pottery.

Lead bisilicate	29
Borax frit	44
Zinc oxide	5
China clay	2
Flint	7
Zirconium silicate	3
Barium carbonate	1
Tin oxide	10
Fires at 1050°C. Lustre reduction 650°C.	

6. A medium earthenware glaze used by Derek Emmis in Stoke-on-Trent.

Lead bisilicate	30
Soft borax frit	60
China clay	10
Tin oxide	10
Fires at 1060-1080°C. Lustre reduction 680°C.	

7. A medium earthenware glaze used by Clive Fiddis in Belfast.

Borax frit	100
China clay	10
Zirconium silicate	4
Tin oxide	8
Fires at 1060°C. Lustre reduction 680°C.	

8. A stiffer earthenware glaze used by Sutton Taylor.

Lead bisilicate	33
Calcium-borate frit	18
Potash felspar	25
Zinc oxide	2

Quartz	14
Body clay (earthenware fireclay)	8
Tin oxide	5-12
Fires at 1120°C. Lustre reduction at 730°C.	

9. A stoneware glaze capable of producing lustre.

Felspar	32
Whiting	14
China clay	10
Flint	21
Alkaline frit	23
Fires at 1260°C. Lustre reduction at 720°C.	

PIGMENTS

Lustre adheres to a glaze because of reactions that occur between glaze and pigments during the firing. This reaction can be brought about either by heating the glaze until it begins to soften, or by including certain fluxes in the pigment itself, or by a combination of both factors. Two types of pigment are represented in the lists on pages 205 and 206; the 'passive' pigments depend for their adhesion on the softening of the glaze; the 'active' pigments adhere partly because of the fluxes they contain.

The clay medium. Lustre of a kind could be obtained simply by applying compounds of silver or copper to the surface of a fired glaze, re-heating it until it softens, reducing the pigments, and rubbing them clean when they have cooled, but it would have been difficult to reduce such concentrated pigments sufficiently. Lustre develops much more easily if the metallic compounds are diluted, and this is most easily done by mixing them with some kind of clay. The clay medium performs several useful roles: by diluting the pigment it makes the metallic compounds more sensitive to reduction; it protects soluble ingredients from being dissolved by steam in the early stages of the firing; iron-containing clays also protect the lustre film from reoxidation (see Question 20, page 231). A clay medium was certainly used by lustre-potters in Spain and Italy, and was probably used in the lustrous of the Middle East from which European methods were derived, though the only early description of Islamic technique is not explicit on this point (see page 210).

Coarse, ochrous clays have always been preferred to smooth clays. Their granular particles allow carbon monoxide to penetrate the pigment easily, with more potent reducing effect. If the pottery is overfired, however, the ochre adheres to the softened glaze, masking the lustre film. China clay (kaolin) can be used as an alternative. Being more refractory, it adheres less to the glaze and is more easily rubbed away when the fired pots are cleaned. On light-coloured glazes, however, pigments with a china-clay carrier are difficult to see when they

are applied. The ideal clay medium, therefore, is a mixture of china clay and ochrous red clay.

Some kind of diluting medium was almost certainly used for all lustre pigments in the past, though not necessarily clay or ochre. Combustible pastes or oils would have performed some of the same functions.

The proportion of metallic compound to medium is important. Pigments very rich in metal are hard to reduce, and weak mixtures give only pale stains. Workable mixtures usually contain about 40% metallic compound (see Question 23, page 232).

Choice of metallic compounds. Any compounds of copper or silver, or mixtures of them, can give good lustre in the right conditions, but they are not all equally sensitive to reduction and therefore lead to different effects. Sulphides, nitrates and chlorides, for instance, are more easily reduced than oxides and carbonates (see Question 12, page 229). Most early lustre-makers started with copper and silver metal, which was burnt with sulphur to make sulphides (see pages 210 and 215).

The metallic compounds in the pigment are converted to oxides when the kiln is heated, yet different compounds produce different lustre effects. The variation is caused by the differing sizes of particles in the compounds: nitrates and sulphides lead to more finely divided oxides than carbonates and synthetically prepared oxides. The finer the particles, the more sensitive the material is to reduction. Larger particles can give as good lustres as any other, but they require longer reduction at slightly higher temperature (see Question 14, page 229).

Many lustre pigments, old and new, include a mixture of silver and copper compounds. The effects differ according to the solubility of these compounds. Insoluble compounds can only be mixed physically and tend to produce lustre films with internal colour variations. Soluble compounds, such as the nitrates, lead to a chemical blend and produce uniform colours of amber, orange, or golden lustre.

All pigments work best if they are finely ground and mixed as intimately as possible with the clay medium.

Calcination. Some lustre-makers calcined their pigments and some did not; calcination is not essential. Most pigments become denser and more sensitive to reduction by being calcined to a low red heat before they are ground, and they usually give a very bright metallic sheen (see Question 15, page 230). Calcined pigments are 'short' and grainy and difficult to apply with a brush unless they are mixed with about 20% of plastic clay. The clay makes the pigment smoother and easier to paint with. As it dries it forms a hard coating so that the pigment is less easily rubbed off when the pots are handled and placed in the kiln.

Application. Every mixture has its particular ideal thickness, but a sound pigment will give some effect whether it is thick or thin. Even a smudge or a fingerprint can appear all too clearly once the lustre has been fired, but if the application is very thin it will show grey

instead of lustrous. Lustre pigments are usually kept as liquids in a small pot, or are spread on a palette, and they are most easily used when they have the consistency of ordinary cream. Traditionally they were liquified with vinegar instead of water (see Question 16, page 230). A few drops of gum arabic or concentrated sugar-water make them flow more easily. Gum also hardens as it dries and makes the painted pottery easier to handle. Gummed pigment settles smoothly as it dries and is useful for areas of flat colour without streakiness, but if *sggraffito* is to be used, there should not be much gum, or the point will be unable to scratch through the hardened pigment.

Pigments have most often been painted with a brush, but they can be applied with a sponge, a spray, a slip-trailer, a thread, or even a knife or a quill. They can be applied direct, or against various kinds of stencils, hard-edges, or masking.

Pigment mixtures: pigments without flux, 'passive'.

1. Orange-gold (best calcined)	4. Tawny-silver to bluish-silver
Cupric nitrate 32	Silver chloride 12
Silver carbonate 3	Tin oxide 10
Red ochre 35	Red ochre 39
China clay 30	China clay 39
2. Red-gold (best calcined)	5. Strong red
Copper sulphide 19	Copper sulphide 20
Silver carbonate 2	Tin oxide 24
Ferric oxide 16	Red ochre 56
China clay 63	
3. Deep iridescent red	6. Orange-gold to red
Silver sulphide 6	Copper sulphide 27
Copper sulphide 22	Silver sulphide 7
Red ochre 42	Red ochre 66
China clay 30	(This is William Burton's reformulation of a Hispano-Moresque pigment, presumably that of 1785, quoted on page 216).

'Active' pigments with fluxes. The reaction between pigment and glaze can be made to occur at a lower temperature by including in the pigment compounds of bismuth, sodium, potassium, mercury, antimony, lead, calcium or zinc. These fluxes can make the pigment adhere even before the glaze itself begins to soften. They can therefore be fired on earthenware glazes at lower temperatures than the passive pigments, and can adhere to high-temperature glazes which would be unsuitable for any of the passive pigments because they do not soften in the normal temperature range, below 750°C. On fusible glazes, fluxed pigments may adhere below red heat (see Questions 17 and 18, pages 230-1).

Their principal disadvantage is that when used with earthenware glazes they can easily be overfired. Then the clay medium adheres to the glaze, covering the lustre film. With

the most active fluxes, such as bismuth, there is only a small margin of error.

Fluxed pigments are neither better nor worse than passive pigments. The effects of both depend on the glazes they are used with and on the way the kiln is fired.

Many pigments used in the past undoubtedly contained fluxes; mercuric sulphide (vermilion) was included in a number of old Spanish and Italian pigments. They were especially useful because they made lustre adhere to the glaze at such a low temperature that the glaze could not be discoloured by reduction. This was particularly important when alkaline-copper glazes or lead glazes were used.

Examples of active pigments with fluxes:

1. Golden-orange to red		China clay	8
Copper sulphide	3	This can be varied by substituting alum or pearl ash (K_2CO_3) or zinc oxide for the table salt.	
Mercuric sulphide (toxic)	14		
Red ochre	40		
China clay	43		
2. Iridescent red (a nineteenth-century Gubbio recipe)		5. Golden-red	
Copper sulphide	43	Copper carbonate	32
Silver sulphide	1	Silver nitrate	2
Mercuric sulphide (toxic)	13	Bismuth carbonate	1
Red ochre	43	Red ochre	65
3. Golden-orange		6. Iridescent silvery-amber	
Cupric nitrate	30	Silver chloride	20
Silver nitrate	20	Copper sulphide	2
Dissolve in water. Precipitate with sodium carbonate. Add to the precipitate		Tin oxide	12
China clay	25	Alum	50
Red ochre	25	China clay	8
Calcine and grind.		Red ochre	8
4. Yellow-gold to orange-gold		7. Bright gold ¹⁰	
Copper sulphide	16	Copper carbonate	40
Silver carbonate	2	Bismuth oxide	20
Ferric oxide	14	China clay	40
Table salt (NaCl)	52	Gum arabic	2
Red ochre	8	8. Bright iridescent silver ¹⁰	
		Silver nitrate	30
		Bismuth oxide	30
		China clay	40
		Gum arabic	2

¹⁰ Used by Sutton Taylor on a glaze maturing at 1120°C with lustre reduction at 730°C. The bismuth content is high and would be likely to make the clay medium adhere to softer glazes.

FIRING

Piccolpasso described a small updraught kiln with a perforated muffle-chamber and made a drawing of it (see Plate 93). The kiln design is certainly important, but in his desire not to mislead his reader when he had no direct experience himself, Piccolpasso was over-cautious. Lustre can be satisfactorily fired in kilns used for other kinds of ceramics.¹¹

It is difficult to fire reduced-pigment lustres in electric kilns. A reducing atmosphere can be made in them by introducing oil, wood, mothballs, sugar, and other combustibles through the spy-holes, but it is not easy to insert enough to reduce effectively. Electric kilns are usually indoors and have no flues, and the carbon monoxide which escapes from them during reduction can be dangerous.

Three sources of information survive about kilns used in the golden age of lustre, when it was regularly produced. Each is an updraught kiln, designed exclusively for lustre. This does not mean that updraught kilns are necessarily the best; almost all old kilns were of the updraught type and most of them have been superseded. One kiln is mentioned briefly by Abu'l Qasim;¹² a Hispano-Moresque kiln is recorded from excavations in Valencia by Gonzalez Marti,¹³ and the third is the design recorded by Piccolpasso. In each of these kilns the draught was impeded in order to distribute the heat and the reducing gas evenly around the pottery, but without exposing the ware to direct flame. The pots were placed fairly loosely so that every part of each piece was exposed to the reduction. In lustre-firings, as Piccolpasso mentioned, the pots may even touch each other, since at lustre temperature many glazes do not soften enough to stick together. Pots may be supported on stilts or spurs, bricks or pieces of broken shelf, or stand one upon another. A well-set lustre kiln can look like a house of cards.

The kiln itself and the fuel should be as dry as possible. Some pigments are soluble, and any steam inside the kiln in the early stages of the firing may condense on the glaze, dissolving the pigment and causing dribbles. As the water evaporates, a stain is left behind. This is sometimes seen on medieval Syrian and Persian lustre ware, and most lustre potters must have known the problem, since all fuels liberate some water vapour as a product of combustion.

Lustre ware can be fired in as little as two hours, depending on the volume of the kiln and the size of the work. However, pottery is easily cracked by heat once it has been glazed, and large objects have to be refired very slowly. The enormously long firings mentioned by Abu'l Qasim, lasting seventy-two hours, were probably necessary because the kilns contained large architectural tiles.

The temperature may rise very slowly until red heat is reached, but once the glaze begins to soften the firing should be as quick as possible. The longer it continues, the more the

¹¹ My own kiln is used for normal glaze and biscuit firings, as is the kiln built by Sutton Taylor, shown in his article 'Lustred Earthenware', *Ceramic Review*, no. 82, 1983, p. 8.

¹² *Treatise on Ceramics*, trans. J. W. Allan, Iran, IX, 1973, p. 114.

¹³ M. Gonzalez Marti, *Cerámica del Levante español*, Barcelona 1944, vol. I, p. 323. A similar design is shown in Daniel Rhodes, *Kilns*, London 1968, pp. 39-40.

film of reduced metal is absorbed into the glaze instead of simply adhering to the surface, and the sheen becomes dulled (see Question 28, page 234). In a small kiln the intense reduction obtainable from gas or oil may cause lustre to develop in as little as five minutes. A more usual period is between forty-five minutes and an hour. The ideal time depends on the size of the kiln, the fuel, and on the nature of the glazes and pigments.

There have been two different but equally effective ways of dealing with the crucial lustre-developing phase of the firing. One involves reduction with rising temperature, and the other reduction with a steady temperature which is soon allowed to fall (see Question 30, page 235).

Reduction with rising temperature follows naturally from firing a kiln with brushwood, as was probably done by most of the early lustre-makers. The kiln is stoked intermittently, new batches of fuel being added as the previous fuel burns down. Once the chamber of the kiln begins to glow with heat, the fire is stoked more heavily so that a smoky, reducing atmosphere occurs. After a few minutes the fire becomes clear again and the temperature begins to rise. The fire is heavily restoked and once more becomes smoky, and the process is repeated. The heat increases slowly and is judged by the colour of the chamber. Trials are taken out as the firing proceeds and once they show a good lustre the firing ends. The firebox is sealed to prevent air from reoxidising the lustre. This method involves a natural alternation between oxidation and reduction and its efficacy was recognised long before potters were able to explain what was happening in chemical terms (see Question 26, page 233).

Reduction with steady and falling temperature follows from the use of gas or oil, in which case the kiln is heated continuously. The temperature is allowed to rise steadily until the softening-point of the glaze is reached. Then the air supply is restricted, causing reduction, and the temperature falls slightly because the combustion is incomplete. After a few minutes air is again introduced, providing complete combustion with an oxidising atmosphere. The temperature steadies and may even rise again. Then reduction begins once more and the temperature stops rising. Spasms of reduction and oxidation continue until the trials show a good deposit of lustre. Then the kiln is allowed to cool quickly and is sealed to prevent the entry of air. This method was used by De Morgan and Franchet and was followed at the Royal Lancastrian Pottery, and most potters who have attempted lustre in recent times have regarded it as normal.

Both these methods of firing are apt to be less controlled than they sound. The potter is working within a narrow and critical range of temperature and the moment of decision, when reduction begins, involves a certain emotional commitment as well as technical expertise. Almost immediately, the glowing pots in the interior of the kiln are enveloped by swirling black smoke; a dense black plume issues from the chimney, and from every crack in the kiln wall and every spy-hole wisps of acrid smoke curl out, depositing soot on anything within reach. Some kilns emit pulsing sighs, like an awakening dragon, and it is difficult to believe at this moment that anything inside can survive the inferno. Piccolpasso's drawing (Plate 93) conveys the excitement.

The first trial pieces are usually amber-yellow. As the firing proceeds the silver pigments become greenish-brown, then silvery-brown, and later a dark bluish-silver. Copper pigments progress from yellow through amber-brown and orange to pink, gold, red-gold, to ruby. If overfired they become a dull, dark purplish-red. The trial pieces are rapidly cooled and only provide an indication of what is happening within the kiln. The lustre inside the kiln develops differently because it undergoes further reduction as it cools.

The kiln is usually cooled as quickly as the safety of the fired pieces will allow, and the character of the lustre is affected by the duration of the cooling period. A rapidly-cooled trial piece, painted with a silver-based pigment, may show a bluish-silvery lustre. An identical piece left to cool more slowly in the kiln is likely to come out with a warmer silvery colour, or even a golden yellow. Copper reds, however, usually come out more strongly coloured than the trial pieces. No two glazes and pigments behave in quite the same way.

OLD TECHNICAL METHODS

The process of lustre-making was seldom written down before the late nineteenth century. The following quotations include descriptions of the reduced-pigment technique before 1800. Four other quotations of related interest are added.

1. Abu'l Qasim of Kashan (AD 1301/700 AH). Abu'l Qasim's treatise on ceramics is part of a larger work. One section of it refers to lustre work and is the earliest known written description of the materials and the process of manufacture.

Those (vessels) that come out of the firing white they paint with the enamel of two firings, or with *lājvard*,¹ or with pure turquoise. The enamel (lustre pigment) is composed as follows: Take one and a half *mans* (or: parts) of red and yellow arsenic, one *man* (or: part) of gold and silver marcasite (types of iron pyrites), one *batman* (or: half a part) of Tisi (or: Tabasi or Cypriot) yellow vitriol (probably iron sulphate) and a quarter (of a part) of roasted copper, and mix to a paste and grind it. A quarter of this is mixed with six *dirhams* of pure silver which has been burned and ground (with sulphur) and is ground on a stone for twenty-four hours until it is extremely fine. Dissolve this in some grape juice or vinegar and paint it on to the vessels as desired, and place them in a second kiln specially made for this purpose, and give them light smoke for seventy-two hours until they acquire the colour of two firings (which is like gold). When they are cold take them out and rub them with damp earth so that the colour of gold comes out. Other people add certain preparations like *sirinj* (lead oxide) and *zanjār* (verdigris or copper acetate) to this enamel. In fact *shādanej* stone (not identified) with roasted silver serves the same purpose. That which has been evenly fired reflects like red gold and shines like the light of the sun.

(From Abu'l Qasim's *Treatise on Ceramics* translated and annotated by J. W. Allan, *Iran*, IX, 1973, p. 114)

¹ *Lājvard* wares were glazed blue or turquoise and were decorated with opaque red and white enamels and gold-leaf (see Colour Plate XIV).

A modern laboratory pigment recipe designed to duplicate Abu'l Qasim's composition is as follows:

3.0	Silver carbonate
2.5	Silver chloride
2.5	Silver sulphate
2.0	Silver sulphide
40.0	Cupric sulphate
3.0	Cupric sulphide
10.0	Cupric chloride
5.0	Ferric sulphate
2.5	Zinc chloride
0.5	Zinc sulphate
0.5	Sulphur
15.0	Yellow ochre
5.0	Arsenic disulphide

See R. H. Brill, 'Chemical Studies of Islamic Luster Glass', p. 337, in *Scientific Methods in Medieval Archaeology*, ed. R. Berger, University of California Press, 1970.

2. Instructions attributed to Benedetto di Baldassare Ubriachi (born 1377). Benedetto came of an old Florentine family. His father was a sculptor. The following passage is not clear from a technical point of view but it undoubtedly refers to the production of lustre which was then known in Italy as *maiolica*.

You take the dry vessel of earthenware that you wish to paint as is done by the makers of *maiolica*; first they give the vessel they want to paint a ground of *cofollo*² which is made of lead finely crushed. This they apply as a tempering ground for the other colours, which without it would neither melt nor would they shine so well. For the colour which looks like gold they take ground orpiment (mercuric sulphide) and a little fine silver, filed very fine; and following their receipt you add one ounce of fine silver to one ounce of orpiment, and take some water which has some of the forementioned *cofollo* in it and mix the orpiment and the finely ground particles of fine silver with all this together; and with a brush paint whatever design you wish with this mixture on the vessel. And to get blue you need no other than the *zaffre* which is used for making blue glass and in the same manner every other colour which is made amongst us; and place the vessel in the furnace; and I think it will be seen to be done as is stated by Benedetto di Baldassare Ubriachi, citizen of Florence.

² *Cofollo* is powdered galena (lead sulphide) and is also mentioned in the notebook of Nicolau Reyner of Barcelona, who used it for glazes, not for the lustre pigment (see extract on page 212).

From chapter XL of the second treatise, 'A fare le invetriature delle scodelle do maiolica', in Gaetano Milanesi, *Dell'Arte del vetro per musaico tre trattatelli dei secoli XIV e XV ora per la prima volta pubblicati*, Bologna 1864.

3. From the *Llibre de les Fornades* (1514-19) of Nicolau Reyner of Barcelona.

A receipt for golden lustre:

- 3 oz Cinnabar (*Varmaló*)
3 oz copper sulphide (*faret*)
12 oz red ochre (*aumangara*)
4 bars (sticks) of sulphur
2 Barcelona reales of $3\frac{1}{2}$ grams (silver coins)

References: Juan Ainaud de Lasarte, 'Loza dorada y alfarería barcelonesa, siglos XV-XVI', *Barcelona, Ayuntamiento: Anales y boletín de los museos de arte de Barcelona*, 1942, vol. 1, pp. 89-104.

4. From *The Three Books of the Potter's Art* by Cavaliere Cipriano Piccolpasso, 1558.

I do not intend to go on yet further until after I have discoursed to you upon gold maiolica, from what I have heard of it from others, not that I have ever made it myself, or even seen it being done. I do know that it is painted over finished wares. This I have seen at Gubbio in the house of one Maestro Cencio of that place, and they follow this method in painting it. They leave the places where it is to be put on without laying any sort of colour on them; that is to say, taking an example, an Arabesque of this sort or else a Grotesque will be executed on a plate, and the leaves that would properly be done in green are left blank, only the outlines are drawn. The wares are then fired to a finished state like other wares, and after firing these blanks are filled with maiolica which is made thus:

Maiolica Red:	A	B
Red earth	oz 3	6
Armenian bole	oz 1	0
Ferretto of Spain ³	oz 2	3
Cinnabar	oz 0	3

With the last mixture B, mix a calcined silver *carlino*. All these things are ground together, then put them in an earthen pot of the size that costs a *quattrino*, and fill it full of red vinegar,⁴ and leave it until such time as the vinegar is consumed; then grind it anew

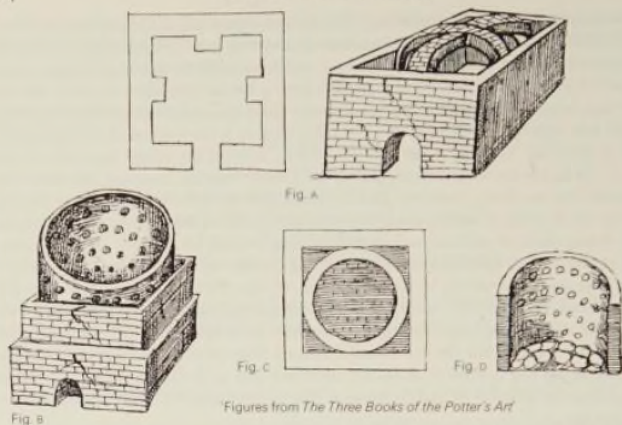
³ This material is mentioned by Antonio Neri as a colorant for glass and has been convincingly interpreted as copper sulphide. See William Burton, 'Lustre Pottery', *Journal of the Society of Arts*, vol. IV, 7 June 1907, p. 762 et seq.

⁴ That is, especially strong vinegar.

with vinegar, and use it for painting. The painted (ware) is put in the kiln and this is very different from the other practices, inasmuch as such wares are put in the kiln mouth downwards leaning upon one another as is seen here, without any use of saggars, but in such a manner that the first always rests upon a biscuit porringer, in order that the fire may have its channels; and stacking them thus, one against the other, fill up the entire kiln which is as different from the other kilns as is the method of setting the kiln and of painting. This (kiln) has only two arches, whereas the others have four or five or six. Its arches are set crosswise, that is, one crosses from the sides and the other runs between the two faces, front and back; it has only four vents for the fire, one in each corner; on its arches is fashioned a circular container, after the manner of an amphitheatre, and this is made of *sciabione* and should be large enough for its body to touch—nay, rather, rest on—all four faces of the kiln, leaving the fire vents free, without any obstruction. The container should be pierced all over so that there is a passage from one side to the other, in order that the fire as it goes spreading around the container may enter it, all the more subtle heat distilling itself through these holes. This (kiln) has only one mouth and through this the fire is made. It is set from above as in brick-making. The making of the fire is different from the other way just as the kiln is different in all its parts from the practice in making pottery. But before I treat of this, I intend to show you the kiln.

Here you have the plan (figure A). There are many who build them without foundations; nay, rather, I say, they use to make them on the floors of houses which are locked and under close guard, for they look on the manner of making the kiln as an important secret and say that in this consists the whole art, and through the goodness and merits of those who have given me this secret, I am going to try as well as I know how to show you all I understand about it, without disguise. Here I have set down the elevation of the kiln as far as the arches. It now remains for me to show it to you with its container, which is what you see here (figure B), with regard to which it must be taken into consideration that in forming the complete circle, there remain at the four heads of the corners four triangles which are left open, and these are the vents for the fire. But so that you may understand me well, I will put down my description in a drawing (figure C). You see, then, the present square, which is in fact the square of the kiln. Inside it you see the perfect circle of the container which goes within it. See how, between the wall and the circle, four triangles are left over which become the four vents of the fire of which I have already told you. Henceforward I assume that I am understood.

Nevertheless I do not wish to stop until I have shown you in a drawing the manner of setting the kiln and the kiln with the fire. Then we shall treat of its firing, of the method of recognising (when) the wares (are) fired, and their burnishing. I know you must remember that I have already told you that maiolica wares are set in the kiln (resting) on round biscuit porringers, and here I have thought it best to represent for you one half of the container with a circle of porringers at the bottom, so that what I say may be better understood with the eye (figure D). This is the fashion that must be kept in

Figures from *The Three Books of the Potter's Art*

setting the kiln, always turning up the wares one on the other. It must be known that these (kilns) are always made small, as one might say three feet on all sides, or else four, and this comes about because the art is treacherous for oft times of 100 pieces of ware tried in the fire, scarce six are good. True it is that the art in itself is beautiful and ingenious, and when the wares are good they seem like gold. Only three sorts of colours are made in this (art), that is, gold, silver and red. Let him who wants another colour on them put it on before the second firing, always leaving the blank fields for the maiolica.

Now that I have brought you thus far, it should be known that once the kiln is set, the fire is lit in it, always with the name of Blessed God, and is then increased little by little as is done with the other wares. The fuel for it should be straw or else willow-branches, well dried and free from damp; keep up the fire with these for three hours, after which, and already the kiln will be beginning to show a certain glow, take broom or spartium, as Dioscorides calls it, well dried and seasoned, and leaving off the willow give it an hour of fire with this. Having done so, take up a sample piece from the top with a pair of pincers (Plate 93); others are in the habit of leaving a spy-hole in one of the sides and pulling out a sample or piece of ware through it; and if it seems to them sufficiently fired they slacken the fire, and when it does not they keep up the fire until it is finished. After this the (kiln) is allowed to cool; the moment it becomes cold, the wares are taken out and given a bath in a tub of washing-lye or buck-lye. Then they are rubbed one by one with a piece of wool; after this, give them another rubbing with another dry piece of wool and with ash, and in this way they will reveal to you all their beauty.

The Three Books of the Potter's Art, translated and introduced by R. Lightbown and A. Caiger-Smith, London 1980, vol. II, pp. 86-91.

5. A 'secret recipe' from a sixteenth-century manuscript 'written in a coarse style'.

Golden maiolica colour—take 3 lb armenian bole; take $1\frac{1}{2}$ lb cinnabar; take 1 lb burnt copper; then take as much silver as (there is) in three *soldini* and put it in a crucible and put in three sticks of sulphur of a finger's length, and see that they are well ground up and place it over these three *soldini* and place them on the fire. And when the sulphur is all broken down, that is to say burnt, the silver will be calcined. Take this silver and mix it with the above-mentioned substances ground finely; then put them in a small earthenware pot and put them to boil with vinegar, and leave it to boil until the vinegar is consumed, and so that it can all be painted on bowls; and know that in the firing there should not be any great heat.

Translated from the Italian. Published without explanation or references amongst notes in *I Tre Libri dell'Arte del Vasaio del Cav. Cipriano Piccolpasso Durantino, riveduta diligentemente sovra un nuovo MS da G. Vanzolini, coll'aggiunta di alcune notizie intorno al fabbricar la majolica fino, del Canonico Gianandrea Lazzarini*, Pesaro 1879.

6. Description of lustre made at Muel, written by Henry Cock, Apostolic notary and member of the royal bodyguard, in his account of a journey in 1585. He says that the population of the area was almost entirely Moorish at that time. After describing the bisque firing of the pottery, the preparation of the tin-glaze, and the glaze firing, he adds:

Then, in order to make all the pottery golden, they take very strong vinegar with which they mix two silver *reales* (small silver coins) which have been powdered, and vermilion (mercuric sulphide) and vinegar and a little alum, and when it is completely mixed together they draw whatever they wish with a pen (*pluma*) on the dishes and bowls, and place them a third time in the kiln so that they finish with a golden colour, which cannot be removed from them short of breaking them in pieces. The potters themselves told me this.

A. Morel Fatio and A. Rodriguez Villa, *Enrique Cock. Relacion del viaje hecho por Felipe II, en 1585, a Zaragoza, Barcelona y Valencia*, Madrid 1876, pp. 30-1.

7. Another lustre receipt from Muel dates from about 1765 and was included in the Ordinances of the Fraternity of the Potters. It is remarkable for the amount of lead required, and also for the inclusion of gold-leaf.

Litharge, two parts; minium (red lead) one; powdered silver, half, or in its place gold leaf powdered and mixed in.

J. Galiay Sarañana, *Cerámica aragonesa de reflejo metálico*, Zaragoza 1947, p. 18.

8. Description of lustre-making from the report written in 1785 at the request of the mayor or chief magistrate of Valencia, Don Martínez de Irujo, to be sent to the Count of Floridablanca.

The ware has (already) been biscuit-fired and glazed with a tin-glaze (enamel) and is fired a third time to make it golden.

The lustre pigment has five ingredients, namely, copper, which is better the older it is; silver, which is likewise better when it is old; sulphur, red ochre (*almazarrón*) which is known here as *almagre*, and strong vinegar; each mixture of the above ingredients is made up in the following proportions: copper, three ounces; silver, one *peseta*; sulphur, three ounces; red ochre, twelve ounces, and vinegar, one *azumbre* (about two litres) which is here understood as half a quart, and to all this is added three pounds of twelve ounces (to the pound) of the dirt or scrapings which come off the ware after the firing to make the golden colour, the vessels being cleaned in a tub of water in which this deposit collects.

All these ingredients are blended in this manner: a little powdered sulphur is placed in an earthen cooking pot together with two small pieces of copper, and in between them, a one *peseta* piece; then layers of sulphur and copper are placed (on top) until all the materials are used up. Arranged in this manner, the cooking pot is placed on a fire and is heated until the sulphur is consumed, which will be known to have happened when it makes no more flame; next it is taken out of the pot and when it is cold it is ground up till it becomes very fine; then the ochre and the dirt (from the tub) are mixed in and stirred well by hand, and then the whole mixture is ground again until it becomes powdery. This powder is placed in a large bowl, where it is spread over the surface with the help of a little stick, so that no place remains uncovered anywhere on the side or the bottom, and for this it is important to pour in water little by little so that the whole mass becomes of the same consistency.

The said bowl, in the state just described, must be put in the kiln for six hours, which is done here in the first firing of the red clay wares (bisque firing), and when it comes out all the composition is scraped off with an iron tool and is put into a washing basin, and there it is crushed a little to remove any lumps, and then it is put into a small hand-mill, a kind of mortar, together with the vinegar, which has so far not been used, and it is ground for two hours, and the material which results is the aforementioned golden pigment which is now ready for painting on the ware.

Originally published by Don Juan F. Riaño, *Sobre la manera de fabricar la Loza dorada de Manises*, Madrid 1878. The text is transcribed from B. M. MS Egerton 507, folio 102ff.

9. A letter from Pietro Gai of Pesaro to Clement Wedgwood, dated 10 November 1863. Gai was one of the first potters to revive the old lustre technique (see page 159). His kiln seems to be based on Piccolpasso's description of the Gubbio kiln in 1558 (Plate 93), which Gai knew from Antonio Caiani's edition of *The Three Books of the Potter's Art* published in Rome in 1857. Gai was distressed that the instructions he had sold to Wedgwood had

not worked; this careful description of how the kiln should be fired was a vain attempt to put things right.

Honoured Sir, In reply to your letter of the 22nd of last month, in which I learn the results of the trials of the Maestro Giorgio lustres, I give you now an answer as to what action should be taken on every point. First, however, you must have these lustre compositions really well made in order to achieve their true brightness. A better way of obtaining the ruby colour, without preparing the copper with sulphur, that is, making *ferretto*, is to use *Aristopetro*. Without any preparation, this *Aristopetro* is milled with the other ingredients. It is a natural and very sensitive sulphide of copper, and is more responsive to reduction. All these compositions [sold to Wedgwood's the previous year] are sound, but the main difficulty is to control their reduction.

The heating of the Maestro Giorgio lustres should be done in the same way that the steely-coloured [liquid platinum] lustres are heated in the Staffordshire factories, and with the same temperature, that is, less than the melting-point of silver. These lustres involve more difficulty than the steely-coloured lustres because of the perforated muffle and the damage that can result from the irregular play of the flames. The first stage of the firing simply serves to heat the chamber as evenly as possible; there should not be too much flame; it should begin gently (and if there is smoke it does no harm at this stage), and the heat should rise increasingly over a period of 3–4 hours. This leads into the second part of the firing. In this there should be distinct flame, and it will last for about an hour, or less, according to need.

It is sufficient to have three or four small trial pieces in the bottom of the kiln and also in the upper part. These are taken out when the chamber is seen to have become a dull red colour. When they are weak in colour it is a sign that they need to be put back again so that the colour enters more fully into fusion with the glaze. It is also a sign that the colour has not combined with the glaze (*coperta*), but (?) a blackish effect may arise either from too much smoke or from too much heat.

After the firing the inlets to the kiln can be left open without harm. . . .

When the chamber is well heated in the first stage of the firing and the second stage is reached, it is essential that this time the flame enters inside the muffle; at the end, however, it should die down again, and there should not be too much broom or other brushwood in the hearth, for that gives a lot of flame.

The kiln works well when it is evenly heated, and its roof or covering should have little holes, like the muffle, but these holes should not be very big. . . .

The glazes (*vernici*) should not be too soft, because if they are so, it does not allow time for the chamber to heat up evenly, and the glaze softens and the colour adheres to it too quickly, together with its ochre, which protects it from the draught, and they fuse together.

If the distance were not so great, I would have liked to be of service to you when you need my presence, because I see well how difficult it is to describe the process by

letter. Also, I am quite experienced in painting on the glaze in the manner of our painters of the *cinquecento*, and also in imitating Maestro Giorgio. You have only to tell me how I can be of service.

With regard to our personal interest, I beg you to remember that I am an artist, and that I am trusting in your discretion and kindness. And with profound esteem and respect I may sign myself,

Your most faithful servant,
Pietro Gai

Translated from the Italian original in the Wedgwood archives, University of Keele, Staffordshire, and quoted by kind permission of the director of the Wedgwood Museum, Barlaston.

10. This is not a lustre pigment but a method for making a stable alloy of silver, from a Romano-Egyptian papyrus of about AD 300. It is one of the many materials that were attached in leaf-form to stone, metal, and glass to make them look golden or silvery. It resembles the preparations that were later applied by heat to pottery and glass to make lustre.

Take copper which has been prepared for use and dip it in dyer's vinegar and alum and leave it to soak for three days. Then melt one *mina* (about 0.5 Kg)* of the copper, some Chian Earth and Cappadocian salt and flaky alum up to six drachmae. Smelt it carefully and it will be excellent. Add not more than 20 drachmae of good and tested silver which will make the whole mixture imperishable (untarnishing).

* Equals about 100 drachmae.

Dr F. Sherwood Taylor comments:

The process is, first, a superficial cleaning of copper . . . Next the copper is melted with a sort of fuller's earth, with salt and with 'flaky alum', a term which in the works of the alchemists seems to be used in some places for a composition containing arsenic. A fusion, carefully performed in order not to drive off all the arsenic, gives a white or whitish yellow copper-arsenic alloy. By fusing this with silver a brilliant white alloy, containing perhaps 77% copper, 19% silver and 3% arsenic, would be obtained.

From F. Sherwood Taylor, *The Alchemists*, London 1951, p. 23. The recipe quoted is the first of a large collection in the *Papyrus Graecus Holmiensis* in Stockholm.

11. It is usually believed that all Islamic lustre was reduced and that lustres made from dissolved gold fired in oxidation were unknown in the Middle East. The following preparation suggests that this is not so. It is believed by Said Es-Sadr to come from an old Iraqi book of the sixteenth or seventeenth century. Es-Sadr connects this receipt with the early alchemist Jabir ibn Hayyan.

Take one part of gold (1 part = 24 mescal) hammered very thin and cut into small pieces. Put it in a glass vessel. Then add kabritic and nitric acid and (some kind of) salt. Leave for three days in a damp dark place. Then add four parts of tin. After three days you will find that the pieces of gold have turned to fine powder.

Put this powder in a dish and add 125 grams of glass powder, 125 grams of silica, 125 grams of borax. Then add some water. Mix it all together and leave it for two days until all the solid matter has settled. Use this material as the golden colour. Fire it for three hours in the kiln (after painting on the ware) without any reduction. Be careful that there is no smoke or carbon in the chamber.

From Said Es-Sadr, *Medinet al Fukhar*, Cairo 1967, p. 117 (in Arabic).

12. Thomas Lakin's preparations for liquid gold and platinum, published by his widow in 1824.

Gold Lustre

To dissolve the gold, take
30 parts of Muriatic (hydrochloric) Acid
10 parts of Nitric Acid
5 parts of grain (powdered) gold
to which may be added 5% of the weight of the gold of metallic tin.

Prepare separately

30 parts of Balsam of sulphur
20 parts of Spirits of Turpentine.

These are heated over a water-bath until even and fully mixed. The gold solution in the acids is then poured in.

The Balsam sulphur is prepared from

4 parts of fine flowers of sulphur
8 parts of Spirits of Turpentine
16 parts of linseed oil.

The flowers of sulphur should be simmered with the turpentine until evenly mixed. Linseed oil is added, little by little, and then the whole should be heated for one hour and strained through muslin.

Platinum or 'Silver' Lustre

30 parts of Muriatic (hydrochloric) Acid
10 parts of Nitric Acid
5 parts of platinum metal.

This acid solution should be mixed with 135 parts of Spirits of Tar.

(Spirits of Tar is a pinewood tar thinned with turpentine. It is mainly resin. In firing, the platinum chloride is reduced to a metallic film by the combustion of the resin.)

From W. D. John and Warren Baker, *Old English Lustre Pottery*, Newport, Mon. 1951, pp. 19–20.

The following publications include descriptions of working methods or preparations of pigments. The most detailed are marked*.

*William Burton, 'Lustre Pottery', *Journal of the Society of Arts*, vol. LV, 1907, pp. 756–66. General description of materials and firing.

*A. J. Cross, *Pikington's Royal Lancastrian Pottery and Tiles*, London 1980, p. 41. Pigments and description of kiln and firing.

T. Deck, *La Faïence*, Paris 1887, pp. 233–4. Short description of firing and pigments.

*W. De Morgan, 'Lustre Ware', *Journal of the Society of Arts*, 24 June 1892. Published in full in W. Gaunt and M. D. E. Clayton-Stamm, *William De Morgan*, London 1971, pp. 156–65. Pigments, materials, and firing.

C. Fiddis, 'The Lure of Lustre', *Ceramic Review*, London 1980, no. 61, pp. 8–10 and no. 62, pp. 22–5. Pigments and firing.

*L. Franchet, 'Etude sur les dépôts métalliques obtenus sur les émaux et sur les verres', *Annales de Chimie et de Physique*, 8e série, tome IX, Paris 1906. Lustre pigments, lustre glazes, and firing.

R. Hainbach, *Pottery Decorating*, trans. C. Salter, London 1907, pp. 66–7. Resinates and reduced-pigment lustres.

F. Hamer, *The Potter's Dictionary of Materials and Techniques*, London and New York 1975, pp. 187 and 301–2.

A. Lomax, *Royal Lancastrian Pottery, 1900–1938*, Bolton 1957. Chapter on theory and technique of reduced-pigment lustre.

C. W. Parmelee, *Ceramic Glazes*, 2nd edition, Chicago 1951, pp. 290–5. Resinate lustres, reduced-glaze lustres, and pigment lustres.

A. Peascode, 'High Temperature Glaze Lustre Firing', *Pottery in Australia*, vol. 20, no. 1, 1981, pp. 27–9. Glazes, slips, pigments, and firing.

K. Shaw, *Ceramic Colours and Pottery Decoration*, London 1962, pp. 57–74. Gilding, liquid golds, and resinates.

F. Singer and W. L. German, *Ceramic Glazes*, London 1960, pp. 43–5. Reduced glazes and pigment lustres and recipes.

Sutton Taylor, *Lustreware*, Leeds Art Gallery, 1980.

C. Vincent Davis, 'Reduced Lustres', *Ceramic Age*, August 1954, pp. 44–6. Reduced pigments and reduced-glaze lustre.

Amanda Warner, 'Smoked Arab Lustre', *Pottery in Australia*, vol. 22, no. 1, 1983, pp. 14–18.

14

THE SCIENCE OF LUSTRE: QUESTIONS ANSWERED BY FRANK HAMER

So far, the physical and chemical principles underlying the lustre processes have only been referred to in passing.

The omission is deliberate because lustre can be made, and indeed usually has been made, by people with little if any grasp of its scientific aspects. No amount of science helps a potter to distinguish between a glaze which is too thick and one which is too thin, or between a fat pigment and a lean one, although a scientist can explain why their effects are different. The scientific basis is complex, and a full account would require a specialised book in itself.

Yet anyone who attempts to make lustre, and many of those who enjoy the finished work, will ask themselves questions about its physical basis. The following series of questions and answers is an informal venture into this domain and gives some idea of its extent. The questions have arisen during practical work. In answering them Frank Hamer combines his knowledge as a practising potter and as a lecturer in ceramic science and has drawn upon his own original research into the physical basis of colour.¹

The questions follow roughly the same sequence as the preceding practical notes. The answers are not intended to be comprehensive; they describe as simply as possible the physical principles involved in the working-potter's processes. They explain some of the effects which are frequently noticed, and also suggest certain new lines of technical investigation.

Fundamental Questions

Question 1 What is colour?

Colour is the sensation we experience when light of a particular wavelength enters the eyes. Three sets of cone receptors within the eyes are sensitive to the presence and absence of the wavelengths of red, green and blue light corresponding to long, medium and short light waves. For our purposes we can accept the simplified theory of three distinct primary colours, red, green and blue making up white light and three types of cone selectively sensitive to them.

Light is electromagnetic radiation, the energy of which stimulates the nervous system.

¹ See F. Hamer, *The Potter's Dictionary of Materials and Techniques*, London 1975 and new edition by F. and J. Hamer, London 1985, a familiar reference book for the whole international fraternity of potters.

We see an object when light is reflected from its surface. But some substances do not reflect the light, or reflect only a little and so these are difficult to see and are referred to as *transparent* substances, for example, water and clear glaze.

White light, sunlight for example, striking an *opaque* substance is either reflected totally, making the substance appear white; or is absorbed partially, making the substance appear coloured.

Question 2 *Why do some ceramic materials produce colour in glazes, while others do not?*

The atoms of most elements present in glazes do not reflect the light energy nor do they absorb it. For our purposes they are transparent. But some atoms reflect totally and therefore appear white. Further, if these atoms are grouped together to present a smooth surface this will look shiny. The pure metal silver is an example of this type of atom.

The atoms of a few elements absorb some of the light energy selectively. For example, the pure metal copper absorbs the energy of the wavelengths which make up green and blue light. Therefore light reflected from copper is deficient in green and blue and appears red.

The copper atoms use the energy which they absorb to boost their electrons to higher energy levels within the electron cloud which surrounds the atom's nucleus. Copper is a particularly interesting element because it can produce a number of colours as well as the red of the pure metal.

Not all of the green light is absorbed by the copper atom. Some passes through so that, where a very thin layer of copper is used as a lustre, a green colour can appear mixed in with the red. This mixture is sensed sometimes as two separate colours and sometimes as a modification of the red colour towards orange and yellow. The green is actually reflected from the glaze layer beneath the lustre. The white light composed of red, green and blue wavelengths has been selectively treated by the copper. The red light has been reflected and we see the copper lustre. The blue light has been absorbed along with some of the green. The remaining green light has travelled through the lustre layer to be reflected back through the layer again by the glaze surface.

When copper is combined with other elements a new pattern develops in the electron field of the atom. The atom therefore absorbs a different energy level (a different colour wavelength) and appears a new colour. For example, when combined with a limited amount of oxygen the colour seen is reddish brown. This is the colour of cuprous-oxide powder and is the colour seen in partially reduced copper glazes. With more oxygen the colour is black but this same black copper oxide (cupric oxide) appears green when much diluted by silicon dioxide introduced into its network. Then the copper atom absorbs the red and the blue light but allows the green to escape. The copper is still chemically the same substance but has been altered physically in the shape of its electron cloud by the pull of the electrons in adjacent atoms. The green light passes through the glaze to be reflected from the body beneath. This is green transmitted light similar to that of the thin copper lustre but, of course, in this case there is no red light reflected back from the copper atom.

The copper-green colour in glazes is further modified when strong alkaline fluxes like

soda are present. The sodium atom reshapes the electron clouds of adjacent oxygen atoms, which in turn reshape the electron cloud of the copper atom. The result is that the copper atom absorbs only the red light and we see a bluish green. The presence of lead has the opposite effect, making the copper atom absorb the blue but less of the red. Red and green light together make yellow and a small amount of red mixed with the green gives the apple-green colour of copper-lead glazes in oxidation.

The Nature and Development of Reduced-Pigment Lustres

Question 3 *What is the nature of a lustre film?*

Ideally, the lustre film is one of pure metal composed of atoms of that metal linked together as a solid sheet which is anything from 500 to 50,000 atoms thick.

In practice the metal film will not be pure metal but will contain a number of other elements because the layer was deposited originally from a compound and it is not possible, using the ceramic reduction process, to remove completely the oxygen, nitrogen, hydrogen, carbon and sulphur.

The colour seen on the metallic lustres of silver and copper is reflected light when the thickness of the metallic film is sufficient to act as a mirror. When the thickness is less than 3,000 atoms, the film is less opaque and iridescent effects occur.

Question 4 *What causes the effect of iridescence?*

Iridescence is the property of thin transparent films to appear coloured even though the material itself has no colour, for example, oil on water, a soap bubble, and some insect wings. Iridescence occurs when one half of the light striking the thin film is reflected from the top surface and the other half passes through the material to be reflected from the bottom surface of the film.

The two halves of light blend to be seen by the eye. However, since light travels in waves it can happen that the crest of one wave as it passes out of the material coincides with the trough of another wave which is being reflected from the top surface. These waves are said to be *out of phase*. In such a case their energies cancel one another out and are no longer visible. For this to happen the energy of the waves must coincide exactly and this means that the wavelengths must be identical. Red waves cancel out red waves, blue waves cancel out blue waves, etc.

The loss of red waves from white light results in our seeing a peacock-green colour. And since energy cannot be lost entirely the energy of the unseen red waves is transferred to the peacock-green colour, which gains in light intensity. Other waves which are not completely in opposition but are out of step with one another are perceived only weakly. Those which coincide in phase are seen as extra-strong colours.

This destructive and constructive interference, as it is called, occurs constantly where light is reflected from a top and parallel bottom surface, but it rarely achieves any noticeable

effect because there are plenty of other light waves of nearly the same colour which are adding together their energies. It is only where the film is so thin that all the waves of one or more colours are cancelled out or weakened that we see the specific colours which remain. These colours owe nothing to pigmentation or colouring atoms.

Question 5 Specifically, what factors are involved?

Four factors are involved in producing iridescence: i. the lustre thickness; ii. the balance of light reflected from the two surfaces; iii. the direction of the incident light; iv. the type of light involved.

- i. At 0.1 micron thickness of film the blue light waves reflected from the top and bottom surface meet in phase and are seen as a strong colour, but the green and red waves are not seen. Progressively thicker films allow the green and red to be seen also. However, at 0.2 micron thickness the two sets of blue light waves are out of phase and this colour is lost, only to come back into phase around the 0.3 micron thickness and so on. The thickness of the film, therefore, is responsible for the colour which is seen.

Very thin films produce positive colours but the greater the thickness of the film, the nearer the colour seen approximates to white light. White light is composed of hundreds of different wavelengths, of course, and not just the three (red, green and blue) which we have described for convenience. With films above 2 microns in thickness the colours seen and not seen are alternated across the whole spectrum so that we see a full range making white light.

The thinnest films give the most positive colours because the colours seen are grouped together and those not seen are grouped together. For example, if the violet, blue and green half of the spectrum is not seen, we see the yellow, orange and red light waves together as a strong orange.

Obviously, the film needs to be of uniform thickness to achieve areas of the same colour. Fortunately the process used to deposit the film ensures this.

- ii. All the foregoing assumes that the light reflected from the top surface is equal in amplitude to that from the bottom surface. The film must display this half-and-half property of reflectivity and transparency to create iridescence. Thin films of silver and to a lesser extent copper do this but not all lustre metals do so.
- iii. Iridescent effects are seen to best advantage when illuminated by a multi-directional or extended light source such as the sky or a large window. Directional light, like artificial light, lacks the convergent rays of light available from the extended source so that only a patch of iridescence is possible on the reflected highlight.

This is in contrast to metallic lustres which often look intriguing in directional light where their metallic and body-colour variations are seen.

Iridescence seen at very oblique angles can display different colours from those seen at more usual angles. This is because the light paths through the film are of different lengths. However, this colour variation is often frustrated by total reflection at the top surface.

- iv. There is more chance of seeing iridescence in natural light than in artificial light because natural light contains the full range of possible wavelengths, whereas artificial lights are always limited.

Considering now silver and copper, we find that when a silver lustre is a very thin deposit or is the top stratum of a stratified layer of lustre, it is so thin that it becomes transparent. Thus it allows half of the incident light to enter it while reflecting the other half from its shiny surface. Fortunately this thickness coincides with the thickness which creates iridescence and therefore thinly deposited silver lustres are often iridescent.

On the other hand, a copper lustre selectively absorbs part of the light energy and therefore the thickness at which iridescence is produced is more critical. The incident light needs to be strong for the iridescence to be seen to full effect and the colour range tends to be limited.

Question 6 Is the lustre film a layered structure? That is, is any part of it combined with the glaze?

The lustre film must be a two-layered structure of predominantly metal lustre with a glaze and lustre (glaze/lustre) layer below. The glaze/lustre layer is an integration of the outer atoms of the glaze network with the atoms of the lustre layer proper, producing a layer perhaps 10 or 20 atoms in thickness.

Silver and copper on soft glazes automatically create strong glaze/lustre layers fully capable of binding the flexible lustre layer to the glaze. This is seen where there is progressive erosion of a lustre by cleaning. The glaze/lustre layer is stronger than the lustre itself. However, on hard glazes, like stonewares, insufficient attachment inhibits the build-up of the lustre layer proper. Thick layers deposited by the resinate method might even flake away in one piece.

While discussing the layered structure it is worth mentioning that the lustre layer proper is probably stratified to some extent by the inclusion of impurities. This is equally true of resinate lustres. A thin outer layer often gives iridescence on top of the solid metal lustre and this iridescent layer might be one containing more metal oxide than pure metal.

Question 7 Roughly how thick are the layers?

The 10 or 20 atoms of the glaze/lustre layer is somewhere in the region of 35 Ångströms, a thickness we would need to multiply by 30,000 to reach the thickness of a human hair. The lustre layer above this might reach a thickness about one tenth of a human hair (about a hundredth part of a millimetre or 10 microns). The outer iridescent layer is between 0.1 and 1.5 microns (1,000 to 15,000 Ångströms).

Question 8 How is the glaze/lustre layer structured, and how does it develop?

A glaze surface is composed of oxygen atoms which are the ends of a random network of molecules. Theoretically the whole three-dimensional network of the glaze is balanced, that is, every atom is bonded to sufficient other atoms to achieve electrical neutrality. How-

ever, the oxygen atoms on the outside cannot achieve this state and are said to have unsatisfied valencies. They still possess the capacity to form bonds with other atoms of opposite electrical charge and will, in fact, attract such atoms in order to achieve an electrically neutral state.

Atoms which become available during the lustre firing are those of silver and copper which are attracted to the oxygen atoms and form a strong bond there. The bond with oxygen is taken by the metal atom in preference to the bond with like metal, although like metal atoms are available in overwhelming numbers. This is the start of the development of the glaze/lustre layer.

Next, some of the silver and copper atoms enter the glaze network and form bonds within the network itself, causing a reshuffle of the bonds existing there. This is possible because the glaze network is loosened by the heat energy and therefore able to re-sort its linkages.

Some of the linkages of the glaze network are weaker than others and break under the double effect of heat and reduction. In some glazes as much as 10% of the oxygen atoms near to the surface can be stolen by the carbon monoxide of the reduction. Inevitably this creates a partial collapse of the glaze which is softening but nowhere near to melting. It allows a further reshuffling of the atoms. Some metal atoms, like lead, tin and zinc, and some basic oxides, like soda and potassa in discrete molecule form can be broken away completely, to be replaced by the lustre metal. The result is a layer composed of original glaze, lustre metal and dislodged atoms and molecules to a depth of perhaps 20 atoms.

The glaze/lustre layer reshuffles itself to achieve electrical neutrality but inevitably has unsatisfied valencies at its surface. These are almost totally those of silver and copper, which will be satisfied by weak bonds of metal-to-metal as the lustre layer proper builds up.

The lustre layer is prevented from taking oxygen into its structure by the carbon monoxide which is used for reduction. Carbon monoxide is extremely greedy and steals any oxygen atoms which the lustre metal might otherwise obtain. However, 90% of the oxygen atoms of the glaze are unaffected by carbon monoxide. These are involved in molecules like silica, alumina, soda, potassa, and calcia with tenacious bonds which carbon monoxide cannot break. Thus the glaze remains predominantly composed of oxides and the lustre is theoretically pure metal.

Question 9 *Why do some glazes promote lustre more readily than others?*

In order to create a satisfactory lustre there must first be a suitable glaze/lustre layer established. Some anchorage for the lustre is available on all glazes because they all have oxygen atoms of unsatisfied valency at their surfaces. However, as we have seen, the bonding with these atoms is only the start of the glaze/lustre layer. The establishment of a deeper layer is important and not all glazes are capable of co-operation to achieve this.

Suitable glazes are those which become sufficiently excited at the lustering temperature to loosen their networks and allow metal atoms to enter. The oscillatory bonding which allows this reshuffling of atoms and molecules also creates pulses of stronger magnetic pull

by any atom of unsatisfied valency. Therefore some glazes accept lustres better than others.

The molecules concerned in this loosening activity are the fluxing oxides: soda, potassa, lithia, strontia, lead oxide and to a lesser extent boric oxide. The presence of tin oxide and titanium dioxide also assists by providing suitable anchorages for the lustre metal. Glazes which promote lustre more readily than others contain a higher percentage of these fluxes and anchorages.

High temperature glazes do not promote lustres. The small amount of lustre which does build up is only weakly anchored to the outside oxygen atoms. It is rubbed away all too easily with the ochre pigment after the firing, leaving the beginnings of the glaze/lustre layer as a coloured stain.

Question 10 *What happens when lustre pigments are reduced?*

The reduction works in conjunction with heat. First the heat decomposes the lustre-metal compound where this is not an oxide. Then more importantly it creates an agitated state within the pigment which allows the metal atoms to migrate towards the glaze and form the solid metal layer of the lustre. It also agitates the glaze, making this an attractive anchorage for the lustre.

Reduction is achieved by carbon monoxide which is greedy for oxygen in order to stabilise itself as carbon dioxide. Thus reduction removes oxygen first from the kiln atmosphere and then from the pigment. The weakest bonds are broken first and these include the lustre metal-to-oxygen bonds of silver oxide and copper oxide.

The lustre metals deprived of bonds with oxygen become active atoms or ions which seek new stable bondings. Since the reduction approaches from the outside, the ions naturally migrate inwards through the pigment to find bonds on the surface of the glaze. When these sites are full, the silver and copper ions enter the glaze and cause a reshuffling of its atoms and molecules. This creates the glaze/lustre layer.

There is a limit to how far the ions can enter the glaze because they are in competition with other equally strong and stronger atoms which are already in position. The glaze/lustre layer is limited therefore to 10 or 20 atoms in thickness, showing a progression from glaze to lustre. Later arrivals of silver and copper ions must be satisfied with metal-to-metal bonds on the outside of the glaze/lustre layer. Metal-to-metal bonds are weak in comparison with metal-to-oxygen bonds but they are the only bonds available and the ions cannot remain unsatisfied in the presence of this possibility. This creates the lustre layer.

Because the reduction occurs in spasms, the lustre layer itself is laid down in a series of thinner layers. This stratification is identified by the inclusion of impurities drawn into the layers during the more active periods. A thin outer stratum can display excellent iridescence. However, too many impurities inhibit the shine and encourage tarnish because they distort an otherwise regular structure.

When a period of oxidation follows one of reduction, some of the lustre atoms will link up with oxygen in preference to the metal-to-metal bond. This will occur because oxygen offers a preferred stronger bond and the lustre atoms are still in an agitated state within

the established lustre layer. This agitation decreases as the kiln cools, so that the finished lustre is as stable as solid silver or copper. Both these metals have weak bondings which over a period of time are broken as a layer of metal oxide, carbonate and sulphide appears as a tarnish on the surface.

Fortunately at room temperature this tarnish is not deep but the reoxidation within the kiln could go deeper if it were not inhibited by the close stacking of a relatively impurity-free lustre layer and by the protective coating of the remainder of the pigment.

Ochre is an important constituent of this coating because it contains red iron oxide (ferric oxide). During a reduction period this is reduced to *ferrous* state but during oxidation it takes up extra oxygen to achieve the fully oxidised *ferric* state. Ferrous oxide has a stronger pull on oxygen than has the lustre metal; thus any oxygen entering the pigment coating will attach itself to the ferrous oxide in preference to progressing through the coating to the lustre beneath.

Only when all the *ferrous* oxide has been satisfied and converted to *ferric* oxide will oxygen be capable of reaching and combining with the silver and copper of the lustre layer. By then the next reduction period has begun or the kiln has cooled so much that the silver and copper are less active and only a small amount of oxidation takes place. This oxidation is burnished away with the removal of the ochre coating.

Question 11 *Why does silver develop a lustre more quickly than copper, and why do silver and copper work better than other elements?*

When compared with other elements, silver and copper are remarkably similar in activity. Silver and copper are known as transition elements because the electron distribution around the nuclei of their atoms is such that some rearrangement can take place. Rearrangement allows an element to fulfil many quite different roles in combination with other elements. Silver and copper, therefore, can be obtained as easily handled compounds, e.g. sulphides, which can be ground and prepared as pigments. They can exist also as pure metals. Within workable limits they meet the requirements of the lustre process whereby the metal is deposited on the glaze surface by an amount of reduction which does not harm the glaze itself. They also provide shiny surfaces which do not tarnish too readily.

The present process, which uses carbon monoxide reduction, was developed to use silver and copper, which were and still are readily available. A different glaze, a different type of firing, temperature and reduction could be developed to favour some other elements should they become equally available.

When we come to compare silver with copper we find that silver has a slightly weaker hold than copper on the other element within its compounds. The difference is accentuated by the rise in temperature so that silver compounds are more easily converted to oxide and oxide reduced to pure metal. In this way silver lustres develop more quickly than copper lustres.

Consequently it follows that the resulting lustre is slightly softer than copper lustre and is less firmly attached although sufficiently so for all practical purposes.

Question 12 *Why do some compounds of silver and copper produce lustre films more readily than others?*

A lustre film is a layer of theoretically pure metal. This is deposited on the glaze by a combination of heat and reduction acting on the oxide of the metal. If this metal oxide is in a very finely divided state it can be reduced easily to the lustre metal but if the metal oxide is relatively coarse only a part of it can be reduced to metal.

Silver and copper oxides will produce lustres but, however finely they are ground, the particles are never fine enough to give a total response to the reduction. Paradoxically, a more finely divided state can be achieved by starting with a compound other than the oxide.

The other compounds available are silver and copper nitrates, sub-nitrates, sulphides, carbonates and chlorides. They all decompose with heat below or at the temperature used for reduction and in the presence of oxygen are converted to the oxide state.

As a compound decomposes some dispersion takes place and this creates oxides of states finer than can be obtained by prolonged grinding of the oxides themselves.

In practice the silver and copper sulphides give the best results because they contain no oxygen at all for a beginning and therefore break down into smaller dispersed particles before taking up oxygen to become metal oxides.

Question 13 *Can other metals be suggested as suitable for lustre?*

Theoretically there is a list of some thirty-six candidates. The obvious one is gold, which is another transition element. Bismuth and platinum also give lustres. Iridium, osmium, rhodium, ruthenium and palladium can be persuaded to create surface layers on glazes but are expensive. Cheaper metals like nickel, manganese and cobalt give insufficient shine.

The other twenty-five elements could be made to create metallic layers but very special conditions would be necessary with new methods of pigment formulation and application, a more controlled reduction, possibly stronger, necessitating a glaze with different characteristics and temperature range. The eventual lustre may also lack the expected shine.

Theory and Practice

Question 14 *The finer the particles in the pigment, the more sensitive it is to reduction. Why?*

It is always true that finer materials are more active than coarser ones. Fine sugar dissolves more quickly than sugar lumps, for example. The reason is that a given weight of fine material presents a greater surface area than the same weight of coarse material. Ceramic materials can be ground so finely that one cubic centimetre of finely ground material can have a surface area exceeding 6,000 square centimetres.

It follows that at the surface of fine particles of a lustre-metal oxide there are more oxygen atoms exposed. During the reduction period the carbon monoxide can remove the oxygen atoms quickly without need to penetrate the material. So for a given amount of reduction, more atoms of silver and copper are released from fine pigment than from a coarse one.

Question 15 *Lustre pigments need not be calcined, but in practice calcined pigments give stronger colour and are more easily reduced. Why?*

Calcination is a process in which materials are heated to at least red heat (650°C) in oxidising conditions. The purpose here is to convert the lustre-metal compounds to oxides from which state they are readily reduced to the lustre metal.

Calcined pigments are regarded theoretically as oxides although in practice as much as 20% of the original lustre-metal compound might remain in its original state. Nevertheless, that converted to oxides is in a finely divided state which reduces easily.

Calcination of the pigment before application is preferable to relying upon the oxidation taking place during the early stages of the firing. Thorough oxidation takes time and it is preferable to use calcination rather than extend the firing time.

Question 16 *Calcined pigments were sometimes steeped in vinegar. What advantage would this have?*

There are three possible advantages:

Firstly, the vinegar dissolves some of the silver and copper compounds which have failed to oxidise during calcination. The resulting silver and copper acetates decompose readily during the lustre firing. Thus steeping in vinegar is a way to get the most out of the silver and copper compounds.

Secondly, as the acetate decomposes during the lustre firing it creates some local reduction which helps the creation of lustre.

Thirdly, the vinegar makes the pigment open in texture. This, together with the drying properties of vinegar, assists the drying of the painted pigment on the glaze surface. A quick drying helps to avoid runs.

Question 17 *Pigments modified by the addition of around 20% of alum, salt, potash or washing soda develop lustre at lower temperature. Why is this?*

These materials introduce potassium and sodium oxides into the pigment. These oxides have active molecules which create an excited state within the pigment thus facilitating the passage of the lustre metal.

They also attack the glaze structure, accelerating the development of the glaze/lustre layer.

Because these oxides are so active and volatile it is necessary to overstock the pigment with them to gain any effect, which is why 20% is required.

Question 18 *Why do small additions of mercuric sulphide, zinc oxide and bismuth compounds have a similar effect?*

Small additions of different substances which could be considered impurities often hasten or increase chemical reactions. They act as catalysts which means that their own identities

remain at the end of the process. Therefore small additions of almost any material which is not already included will have some beneficial effect. With such additions there is an optimum amount for any given set of circumstances after which further addition quickly negates the benefit.

More specifically, each of the three materials mentioned can be assigned further important roles.

Mercuric sulphide decomposes and aids the reduction and migration of the lustre metal. Zinc oxide is subject to the reduction and therefore will assist the excitement of the lustre metal and its migration. Bismuth compounds produce low temperature lustres themselves, so again the excitement and migration of silver and copper will be assisted.

All three metals, mercury, zinc and bismuth, will alloy to some extent with the lustre metal, probably in a stratified manner.

Question 19 *Pigments containing chlorine compounds easily lead to vapour-flashing effects. Why? Is the effect similar to the fuming of glass?*

The chlorine flashing phenomenon is also known as flowing and was once a popular way of producing blurred edges to decoration, especially that printed with cobalt pigment and known as 'flow blue'.

In this flashing process the chlorine loosens metal from the lustre pigment area and deposits it on the surrounding glaze causing a blurring or 'flow' of colour around the intended lustre area.

Chlorine is an active element which behaves as an oxidising catalyst during the firing. If not already combined with the lustre metal it quickly does so to form the metal chloride. The metal chloride is an active molecule capable of movement (vaporisation). However, when this molecule meets oxygen then the chlorine atom forces the lustre-metal atom to combine with the oxygen instead of itself. The result is the more stable molecule of metal oxide and a released chlorine atom seeking further pure metal with which to combine and repeat the process. Oxygen is available on the glaze surface adjacent to the pigment. This oxygen is part of the glaze structure but has unsatisfied valency and so presents an ideal anchorage for a lustre metal.

The effect is the same as the fuming of glass except that with glass the chlorine, and sometimes the colouring metal, are introduced into the kiln atmosphere. Fuming is also used on pottery, including stoneware.

Question 20 *The traditional 'carrier' in a pigment is red ochre. Does it remain inert, or does it combine with the lustre film?*

Red ochre is essentially red iron oxide (Fe_2O_3) and clay. The clay content assists the application and the later isolation of the lustre by providing bulk to the pigment. The clay is inert as far as the reduction is concerned but the red iron oxide is not. The iron oxide assists the production of the lustre by creating a blanket of insulation between the reduced lustre and the oxidising conditions which occur periodically and during cooling.

The ferric oxide (Fe_2O_3) is reduced to ferrous oxide (FeO) during reduction when the lustre compound is reduced to pure metal. During a period of oxidation the ferrous oxide prevents the oxygen from passing through the carrier layer and re-oxidising the lustre metal. It combines with the oxygen to regain its ferric state. In the event of a 'tug-of-war' for available oxygen atoms between lustre metal and ferrous oxide the ferrous oxide wins because its attraction for oxygen is the more powerful.

The clay and the iron oxide do not combine with the lustre layer unless the lustre is overfired. However, they do form bonds with the outer atoms of the lustre layer during cooling. These bonds are stronger than the metal-to-metal bonding of the lustre itself and stronger than most of the bonds between the particles of the spent pigment. During the rubbing-down process, this intermediate layer is broken away to reveal the pure metal beneath.

Question 21 *Lampblack is sometimes added to the ochre to assist reduction. Would other substances achieve the same result?*

Lampblack is a very fine form of carbon but any material containing carbon and possibly a very small amount of sulphur will assist reduction—for example, fine mud or river slime, fruit juices, sugar, wine and vinegar.

There are no other isolated chemical elements like carbon which could be used instead.

Question 22 *Since it is easy to reduce by restricting the air supply, is there any point in adding such substances?*

If reduction can be achieved easily by restricted air supply there seems at first sight to be little point in these extras. However, when one realises that the whole business of lustres is a balance of reduction of lustre and oxidation of glaze, one also realises that a small amount of local reduction is very useful to tip the balance in favour of the lustre. It might be the presence of a small amount of reducing agent, like lampblack, that makes the difference between a first-class lustre and a mediocre one.

Various additions will act at different times (temperatures) in the firing and although the carbon will burn out, the effect accumulates to keep the pigment layer tipped towards reduction. Any action from 500°C upwards will help the lustre itself to start its migration towards the glaze surface.

Question 23 *In practice, the best proportion of metal compound to carrier is around 40% compound to 60% carrier. Could an optimum proportion be suggested theoretically?*

An optimum proportion is not calculable by chemical theory alone because there are too many variables involved.

The variables involved are: the thickness of the applied pigment; the glaze composition; the degree to which the glaze materials have been integrated in firing (under- and over-fired glazes respond differently); the intensity of the reduction; and the duration of the reduction and oxidation periods. Each part of the kiln will favour a different optimum proportion.

Question 24 *The thin lustre film is sensitive to abrasion and attack by acids. Is this inevitable, or would certain additions make it more resistant?*

Attack and abrasion are inevitable because silver and copper are soft metals. Their metal-to-metal bonds are not strong and can be interfered with by acids and physical force. Being very thin layers, the results of attack and abrasion quickly show.

One solution to the problem is to produce an alloy of the lustre metal by introducing small amounts of beryllium, bismuth, manganese, palladium, platinum, tin or zinc. Such an alloy is likely to be harder than the pure metal.

Firing Lustre

Question 25 *At what stage of firing would a lustre film develop most readily?*

The requirements for the development of a lustre film are: a finely dispersed metal oxide; a temperature high enough to allow reduction of oxide to metal to take place; and a glaze with a suitable maturing range.

If not already calcined, the lustre pigment will need to reach between 600°C and 700°C before the lustre-metal compound has decomposed, dispersed and oxidised. Sulphides, sulphates, nitrates and carbonates begin decomposition as early as 300°C and continue in stages up to as high as 700°C .

However, already calcined pigments contain theoretically oxidised silver and copper which can be reduced to metal from 500°C upwards.

An upper limit of around 700°C can be set by the fact that above this temperature the carrier part of the pigment tends to become involved with the lustre surface causing roughness.

So between 500°C and 700°C is the practical temperature range for the creation of the lustre metal.

Practical glazes in everyday use are those which are physically hard. Yet to accept a lustre, the glaze must become excited during the firing, as do soft glazes. The best compromise is to use a moderately hard glaze and use the upper third of the 500°C to 700°C range to lustre it. Thus we arrive at the popular range of 630°C to 700°C .

Question 26 *Alternating spasms of reduction and oxidation are important to prevent the glazes becoming heavily reduced. The alternation appears to make the pigments more sensitive to reduction. Could this be so?*

Alternation probably does make the pigment more sensitive by breaking down the oxide particles, dispersing the metal atoms thoroughly and driving them efficiently towards the glaze surface to build a thick layer of lustre.

Each spasm of reduction gives impetus to the dispersion of the metal atoms thus clearing the surface of the metal oxide for further reduction. Reoxidation establishes the dispersed metal in a new position as an oxide from which reduction moves it again. Alternation thus

breaks down the metal oxide and disperses the metal in a way that one prolonged reduction could not do.

Question 27 If either firing temperature or the duration of the reduction are insufficient, only a pale stain develops. Why?

The development of a satisfactory lustre depends upon the development of a suitable glaze/lustre layer for anchorage. This glaze/lustre layer can only develop in the first place if the temperature is high enough to loosen sufficient network bonds within the glaze to allow the entry of some lustre-metal atoms. Insufficient temperature means that the metal atoms remain at the glaze surface unable to build up a lustre layer.

The purpose of the reduction is to ensure the supply of the lustre-metal atoms and insufficient reduction results in only enough to create a pale stain.

Question 28 It appears that when reduction is prolonged, a dull metallic film develops. Why?

When periods of oxidation interrupt the reduction, some lustre-metal atoms within the pigment reoxidise. The following reduction then liberates them and drives them inwards towards the lustre layer with new impetus. Given uninterrupted reduction, their progress becomes sluggish and they involve themselves with the carrier of the pigment. At the lustre layer they form a scum composed of lustre metal and carrier which gives the dull metallic surface.

Overfiring also gives this defect by overstimulation of the lustre layer which integrates the carrier at the lustre surface.

Question 29 With prolonged reduction and insufficient oxygen, glazes containing lead and tin become grey, or even very dark. Is this caused by reduction of the tin, or the lead, or both? Why do alkaline glazes containing tin not change in reduction?

The grey colour is mostly reduced tin oxide. Fully oxidised tin is tin dioxide (stannic), which is white. Reduction of this produces either the tin metal or the halfway stage of tin monoxide (stannous), which is black. The tin oxide at the surface of a glaze, and also within a glaze, is reduced, readily producing the grey colour. It also readily reoxidises while it is hot (above 500°C). Below this temperature it is trapped within the glaze and is bonded within the glaze structure.

Tin monoxide is greedy for oxygen and this helps to keep the lustre in metallic form by stealing oxygen which the lustre might otherwise acquire. It is often included in glazes as a stabiliser of reduced effects.

The reduction of tin oxide within the glaze is assisted by the fact that the lead oxide can also succumb to reduction. Here the reduction results in the breakdown of the glaze structure thus exposing the tin oxide to reduction. Lead oxide is reduced to metal form and can be responsible for discoloration. This can also be seen in glazes not containing tin oxide. There is usually a roughening of the glaze surface also as the glaze structure is destroyed. Both the tin and the lead reoxidise readily and the surface heals over but

deeper seated discoloration may remain.

On the other hand, the alkaline glaze-fluxes soda, potassa, calcia, etc. are unaffected by lustre reduction because of the great strength of the oxide bond. Some reduction of the tin oxide occurs at the surface of the glaze but this is insufficient to show as discoloration.

Question 30 Reduction can be done on the rising heat, as described by Piccolpasso, or on falling heat, as done by Deck, De Morgan and others. From a chemical point of view, does it matter which?

The point at issue is really whether the compounds to be reduced are the same in both cases when reduction begins. For example, if a copper compound is fully oxidised to cupric oxide prior to reduction it does not matter whether reduction takes place during a rising, a falling or a steady temperature period.

Assuming that the temperature range of the reduction period is the same for both rising and falling temperatures, it is obviously easier to reach a more oxidised state if one fires oxidised to the top temperature and then reduces as the temperature falls. It is easier also to stabilise the effects of reduction during cooling when the work is moving towards that lower temperature at which the results are 'frozen'.

Question 31 Although lustre reduction takes place well below the melting points of silver and copper, these metals become partially volatile. Is it possible to say at what point this volatility might starve the pigment? That is, is there an upper limit to the temperature of lustre firings?

The melting points of silver and copper are 955°C and 1083°C respectively. These temperatures are depressed by the presence of alloying metals like zinc and tin, bringing the melting points much nearer to the lustre-firing temperature.

Add to this the fact that kiln temperatures are averages. There always exist parts of the kiln which are hotter. Equally, within the pigment, because the ochre particles have sharp corners which vibrate, there are spots which reach the melting point of silver and copper.

However, it is unlikely that the temperature will reach the boiling points of these metals which are in excess of 1300°C. At their boiling points the metals would volatilise completely.

So the volatilisation which takes place does so because parts of the metal melt, by which we mean that the atoms are so excited that they are unwilling to make metal-to-metal bonds to form a solid. In this state they can be persuaded to move out of the pigment, especially in the presence of catalysts like chlorine from the metal compounds and fluorine from the ochre. Carbon, nitrogen and sulphur from the pigment or kiln gases also provide assistance to escape.

The volatilisation of the silver and copper in this way will never starve the pigment completely. The situation is that of a percentage loss over a given time. (If the time is repeated the loss is only a percentage of the remainder and the remainder never reaches zero. It is not an accelerating progression.)

The upper limit to the temperature of lustre firings is decided by a compromise of requirements and considerations. As we have seen, the most important of these are the necessity

to activate the glaze surface, which requires a high temperature, and the undesirability of involving the carrier, which dictates lower temperatures. If less active carriers could be found the upper limit could be raised. Volatilisation of the lustre metal would not of itself preclude success until one had reached temperatures in the region of 1200°C.

TABLE OF ANALYSES

Table of analyses of lustre sherds, obtained by atomic absorption spectrometry, except Pb and Sn (by X-ray fluorescence) and Si (estimated by difference from 100%). By kind co-operation of Dr Mark Pollard, Oxford University Research Laboratory for Archaeology and the History of Art, May 1982.

		Weight % of oxides of									
		Na	K	Mg	Ca	Pb	Al	Si	Ti	Fe	Sn
A. Mesopotamian, 'clear' glaze, slightly greenish, with polychrome lustre, 9th century	Body										
	Glaze	5.0	4.1	3.6	6.4	1.7	2.1	76	—	0.73	0.8
B. Fustat, opaque white glaze, painted with yellow-gold lustre, 11th-12th century	Body	1.4	1.7	3.2	16.8	—	11.0	60	0.92	5.1	—
	Glaze	2.5	2.1	0.44	2.1	27	2.7	57	0.37	0.98	4.9
C. Iran, opaque glaze, slightly reddish-golden lustre, Late 12th century	Body	2.8	1.1	0.98	1.7	—	8.1	84	0.85	0.74	—
	Glaze	4.3	1.4	1.7	2.7	24	3.6	56	0.33	0.76	4.8
D. Syria, clear glaze, poorly preserved, reddish-amber lustre, 13th century	Body	1.9	1.1	1.5	3.3	—	2.7	88	0.13	1.4	—
	Glaze	1.5	2.7	2.4	2.2	<0.1	2.8	87	0.17	1.6	<0.1
E. Spain, semi-opaque glaze with amber-yellow lustre, 15th century	Body	0.5	3.1	2.0	19.6	—	14.7	55	0.65	2.0	—
	Glaze	0.6	3.4	1.6	16.5	20	10.0	42	0.43	3.6	1.5
F. Italy, Gubbio sherd painted with cobalt-blue, yellow-gold lustre and red lustre, Mid-16th century	Body	0.9	3.0	3.0	11.8	—	13.8	62	0.67	5.2	—
	Glaze	1.1	3.7	1.4	6.6	24	8.6	48	0.32	2.7	3.8
G. Safavid lustre, clear glaze on inner surface, blue glaze on outer surface, reddish-golden lustre, 2nd half of 17th century	Body	2.3	0.9	0.7	1.3	—	5.1	80	0.27	0.4	—
	Glaze (white)	4.9	1.3	1.7	2.5	<0.1	3.6	85	0.20	0.5	<0.1
	Glaze (blue)	6.2	1.5	2.7	4.6	<0.1	3.0	81	0.17	1.0	<0.1

Note: D is poorly preserved and some of the alkali in the glaze has been leached away, which accounts for the apparently high Si content. The same may explain the high Si content of G also; though the specimen appears well preserved, alkali may still be depleted by exposure.

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Lustre Pottery

*Technique, Tradition and Innovation in Islam
and the Western World*

